Towards an Interactive Management Approach to Performance Improvement in Bureaucratic Organization

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By
Nien-Tsu Tuan
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Abstract

Organization science is not a new discipline. However, it persistently attracts many researchers to explore new concepts for coping with the increasing complexity in our society. The exploration is in transition, from mechanistic doctrine to systemic and humanistic notions. The mechanistic view is still prevailing and playing a dominant role, but, owing to its increasing critics, appeals for renovation of mechanistic principle incessantly arise. The tendency induces diversified approaches for intervening in the situation of bureaucratic context.

This research investigates the features of organization from three angles – on the one hand, the structure and process (functional) aspects, and on the other, the purposeful behaviour of humans. Many works see the three components as separate, and deal with them accordingly. However, we contend that the three aspects are interrelated and that they should be integrated. The integration suggests that multiple views of organization are adequate because it embodies the attributes of purposeful behaviour and functional characteristics. Problems within an organization can be seen as the mutual influence of these parts. They can mutually aggravate and impede the performance of an organization. On the one hand, we contend that bureaucratic organization is inadequate, owing to its fragility in functional components of processing information to adapt to environment change. On the other hand, its rigid essence causes an inability to deal with human dimension problems. The problematical elements present a systemic relation.

In turn, we attempt to explore the essence of organization's complex problems. The exploration concludes that both complexity and problems are cognitive phenomena. The illustrations suggest that the unearthing of organization problems should be grounded in the 'interaction' and 'consensus' 'model interchanging' of stakeholders. Based on this idea, we propose an intervention framework for diagnosing pathological pattern within bureaucratic organization. The framework is applied to one of South Africa's biggest local governments (the City of Tygerberg). The research result shows that the most significant problem within the City of Tygerberg is in the information-processing subsystem – *associator*. Besides, the 'mental pathology' locates on the 'sink' stage of the structured problem model.

Acknowledgement

This research could not be finished without the help of a number of people. First, I would like to express my sincere gratitude to my supervisor - Prof. Tom Ryan. He introduced me to system thinking and pragmatism philosophy. He is always prepared to have discussions with me, and provide careful criticism of the original manuscripts. Through his referring, I have had the opportunity to access a number of leading system thinkers and have been able to learn the thinking of different schools. Their thoughts advance innovations in different subjects. However, any fallacy in this study is completely my own.

I am indebted to Dr. John Warfield. He devised Interpretive Structural Modeling (ISM), which was developed to Interactive Management (IM) at a later stage. During my research, he furnished me with many valuable opinions in applying IM. In numerous discussions with Dr. John Warfield, I found that his rigorous attitude to exploring and applying knowledge succeeded in providing for me a worthy example.

I would like to thank the Corporate Management Team and the staff of the City of Tygerberg, who participated in the case study. They gave me the opportunities to demonstrate my research. Without their support, I could not have completed the study.

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Glossary

Bureaucracy –

(1) See chapter 3.3.1 about Max Weber's delineation of bureaucracy.

(2) Downs (1966, p. 24) regards Weber's delineation as secondary characteristics of bureaucracy. Downs introduces four primary characteristics by which the secondary characteristics can be logically derived:

- It is large. Generally, any organization in which the highest-ranking members know less than half of all the other members can be considered large.
- A majority of its member are full-time workers who dependent upon their employment in the organization for most of their income.
- The initial hiring of personnel, their promotion within the bureau, and their retention therein are based at least partly upon some type of assessment of the way in which they have performed or can be expected to perform their organizational roles, rather than solely upon either ascribed characteristics or periodic election to office by some constituency outside of the bureau.
- The major portion of its output is not directly or indirectly evaluated in any markets external to the organization by means of voluntary *quid pro quo* transactions.

Bureaucratic – It refers to the quality, which distinguishes bureaus from other type of organization, possessed by many organizations. Bureaucratic behaviour can be exhibited by organizations that are definitely not bureaus, and even by persons who are definitely not bureaucrats (Downs, 1966, p. 26).

Effectiveness – Getting desired results or doing what will meet the customer's need (Davis, Margaret R. & Weckler, David A., 1996, p. 144). The definition given by Carnall (see chapter 3.3.2) corresponds to Davis and Weckler's definition. Both definitions can be logically derived from the other.

Efficiency - Accomplishing results with the least wasteful use of resources (Davis, Margaret R. & Weckler, David A., 1996, p. 144). This definition corresponds to

Carnall's definition (see chapter 3.3.2).

Functionalism – Functionalist analysis of social phenomena investigates the function of a social institution or practice, that is, the contribution it makes to the preservation of a greater social whole of which it is a part (Mautner, 1996, p. 212).

Organization - See the definition of chapter 3.1.

Performance - Describes the results accomplished by an individual or organization, often in comparison with goal, targets or other criteria (Davis, Margaret R. & Weckler, David A., 1996, p. 148). Before improving performance, we should know why & what to improve. If there is no problem in an organization, performance improvement is redundancy. As such, before improving performance, we should pinpoint the problems of an organization. They are the central issues to be tackled.

System – A system is a set of two or more elements that satisfy the following three conditions (Ackoff, 1981, p. 64):

(1) The behavior of each element has an effect on the behavior of the whole.
(2) The behavior of the elements and their effects on the whole are interdependent.
(3) However subgroups of the elements are formed, each has an effect on the behavior of the whole and none has an independent effect on it.

Systemic – A systemic approach is a survey investigating the pattern holding together or integrating a phenomenon or problem, forming a contextual unit. It is the pattern of which information is part which will constitute our continuous focus, not the individual elements in an occurrence or act. The peculiar thing about patterns is that cause and effect are difficult to identify. A pattern can metaphorically be regarded as a circle, and in a circle there is neither a beginning nor an end (Johanessen et. al., 1999, p. 27). As such, systemic is adjective that describes a phenomenon. Systemic pattern is concerned with interdependent elements and their effects on the whole (see chapter 6 & 7).

Contents

List of Figures

List of Tables

Chapter 1 Introduction

'I wish that all the old can live in peace under good care; that there be mutual trust among friends; and all young are loved and nurtured'
- *Confucius Analects,* V/25, ca. 400 BC

1.1 Motivation and Background

The foregoing words of Confucius are drawn from a dialogue between Confucius and his disciples. Once Confucius' two students – Yan Yuan and Zi Lu – were serving Confucius. Confucius said, 'Why do you not talk about your aspirations?' Zi Lu said, 'I would like to share my chariots, horses and fur coats with my friends and even if they are worn out, I shall have no complaint.' Yan Yuan said, 'I would not brag about my strength, nor pass difficult tasks to others.' After the two disciples revealed their aspirations, Zi Lu asked Confucius to describe his own aspirations. Confucius said, 'I wish that all the old can live in peace under good care; that there be mutual trust among friends; and all the young are loved and nurtured.'

Through the dialogue, we can see that Zi Lu is a generous person, who is willing to contribute to the society with material things. Yan Yuan's concern is about his cultivation. By contrast, Confucius's aspiration is to build a society based on harmonious human relationships. For if all the old people are tenderly cared for and the young are nurtured, the society has no discarded weak groups. It implies that the fundamental unit of society – family – is healthy. If friends can trust one another, it means that people's behaviour is established on sincerity. Thus, this world has 'no crime'. We can see that the sage's aspiration is to transform society towards a harmonious world. This goal is still pursued by us.

The contemporary system thinkers also express their concern about the societal problem. For example, Beer (1973) points out that: 'We cannot feed the starving, we cannot stop war, we are in a terrible muddle with education, transportation, the care of the sick and old; institutions are failing, we often feel unsafe in the streets of our own cities. All this is inefficient. Then it cannot be correct to say that the way to preserve liberty is to be so damned inefficient that freedom is not even threatened. We have to become efficient in

order to solve our problems; and have to accept the threat to freedom this entails - and handle it'. Churchman (1970, p. B-50) emphasizes the importance of morality in social science. He says, 'We need to ask to what extent any one of us ought to be morally concerned about lives beyond our own life-spans. Today's concern with the ecology and environment seems to say that we should. But why? What makes me wish for the power of those of the past who are forever powerless, or those of the future who only will come to power in an age when I too am powerless? These must be something deeper than a mere philosophy. This "something beyond personal power" has often been called morality.' Although the thinkers contemplate societal problems through different lenses, their purposes are consistent, i.e., to transform this world to a better condition. We believe that it is a universal goal pursued by humans.

Grounded in different realms, people have different ways of achieving this goal. The religions intend to purify the human mind. The physicists seek great inventions to improve the matter used by us. The sociologists try to explore the social phenomena for formulating policy to cope with proliferating challenges. No matter what field we are in, our endeavours and approaches cannot escape taking human activities into consideration. Developed new materials are produced, distributed and used by humans. Policies are formulated and implemented by humans. Our activities have to be organized in order to pursue our common goal - a suitable world for living in. The 'organized' means organized people. The organized people are called 'organization'. A number of researches have been conducted to understand the 'behaviour' of 'organized people' for increasing the efficiency and effectiveness of an organization. This subject can be called 'organization behaviour'. Conversely, the organization has no 'behaviour' if it does not have 'people'. It starts to display life and behaviour only when 'individuals' are 'organized'. Robbins (1993, p. 7) defines 'organization behaviour' as ' a field of study that investigates the impact that individuals, groups and structure have on behaviour within organization, for the purpose of applying such knowledge toward improving an organization's effectiveness'. According to Robbins's explanation, individual behaviour, group behaviour and organization structure are the three essential components of organization behaviour. The ways that these components affect organization behaviour attract the attention of many researchers. Obviously, understanding of and the proper dealing with

these issues are imperative for us to achieve the goals that we are pursuing.

With little dispute, bureaucracy theory is still a prevailing organizational concept that deeply influences our society. The first bureaucratic system emerged in China in *circa* 200 BC (see Weber, 1948). It flourished in the environment characterized by Industrial Revolution (see Pinchot, 1994, p. 30), and it is still supported by its exponents (see Jaques, 1976). However, as the complexity of our society increases, the bureaucratic paradigm is criticized much more than it has been before. Since its inception, the bureaucratic system has been intended to help us achieve a harmonious society. However, today, contrarily, it impedes us from reaching our common goals. What is wrong with it? How do we diagnose it to intervene in an unsatisfactory situation? This puzzle drives us to probe whether or not certain bureaucratic axioms are not adequate. On the one hand, we aim at furnishing a notion that can complement the conventional doctrine. On the other hand, grounded in the established notion, we propose an intervention framework to resolve the unsatisfactory situation. The endeavour attempts to identify root problems within a bureaucratic context to provide guidance for actions.

1.2 Content and Structure

This research is divided into 10 chapters. The road map is shown as Figure 1-1. Chapter 1 is the Introduction. Chapters 2 and 3 are concerned with the philosophical foundation of this research. Chapter 2 gives an overview of pragmatic epistemology. The primary source of the overview is C. Peirce's epistemology. Peirce's inquiring theory provides us with the adequacy criteria for seeking knowledge, which are of practical use in the understanding of organization phenomena and the solving of problems. In addition, we explore the suitable scope of application of Peircian epistemology to societal problems to avoid misusing it during the inquiry.

Chapter 3 illustrates the contribution of the metaphor theory to organization science. The illustration is underpinned primarily by Steven Pepper's metaphor theory. We will discuss three metaphors that relate to organization science. They are mechanism, organicism and social system. In Chapter 4, we survey the criticisms of mechanism metaphor. We find that the criticisms primarily relate to organization structure, humanity,

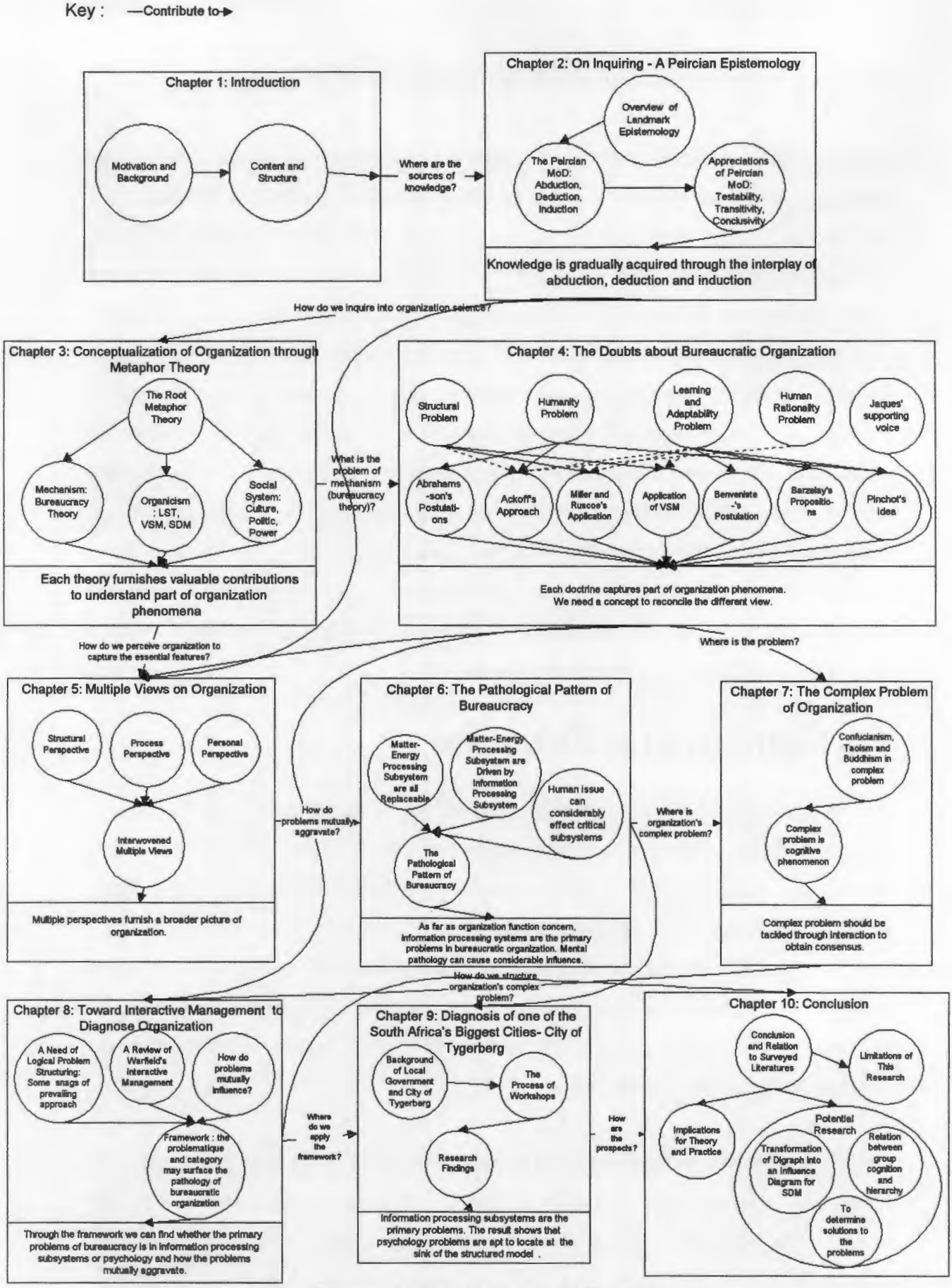


Figure 1-1: The Road Map of Content

learning, adaptability and human rationality. However, on the other hand, we survey the supporting voice for bureaucracy. Apparently, while different people taste the same fruit, some people taste 'sweet', whereas other people taste 'sour'. The survey manifests that each doctrine captures part of organization phenomena. A concept for reconciling different doctrines is required. The concept should reflect the integration of diversified doctrines. It should enable us to identify properly the causes of an unsatisfactory situation within bureaucratic organization.

Based on the Confucian ideal and on contemporary systems thinking, in Chapter 5 we propose a notion that organization can be understood in terms of multiple views where structure, process and personal perspectives shape the foundation. Based on the multiple views, we probe how each perspective furnished us with valuable contributions for explaining organization phenomena. In the exploration, we suggest that Living System Theory provides exhaustive illustration on functional perspective (structure and process) of organization. However, each doctrine has limitations. The limitations are reviewed in chapter 5. In contrast to the limitations, the proposed idea, multiple views, capture a broader picture of organization.

Further to the foregoing arguments, in Chapter 6 we attempt to probe how the three perspectives are interdependent, and cause organization pathology. The exploration suggests that, as far as organization function is concerned, the performance of a bureaucratic organization hinges on whether the information-processing subsystems are efficient. However, when mental pathology is involved, the phenomena are more complex. These components are interwoven and present a complete picture of pathological patterns.

Chapter 7 receives the output of Chapters 4 and 5 to explore the 'where' and 'what' of 'problem' and 'complexity'. Based on ancient oriental classics and contemporary systems thinking, we reason that both 'complexity' and 'problem' are cognitive phenomena. The argument leads us to stress the importance of 'consensus' and 'interaction' in identifying complex organization problems. For 'interaction' and 'consensus' are appropriate tools for the surfacing the invisible complex problem.

In Chapter 8 we propose an interactive approach to diagnose the pathological pattern of a bureaucratic organization and verify our speculations of Chapter 6. The framework integrates the concept of Interactive Management and the Living System Theory. It intends to surface intangible complex problems (as discussed in Chapter 6 and 7) on to a structured interpretive model that encompasses problems of organization functions and people issue. The produced model can help us to realize the systemic nature of a problematical situation and to pinpoint the sources of problems.

In Chapter 9 we show the demonstration result of our framework. The framework was applied to one of the biggest cities in South Africa – the City of Tygerberg. The case study indicates that our speculations in chapter 5 are plausible. The research result is helpful to South African Local Governments as regards understanding the current bureaucracy problems during the political transition.

Chapter 10 is the Conclusion. Conclusions are drawn on the research results and their relation to surveyed literatures. Furthermore, we point out the limitations of this research and suggest a number of researches, which would be worthwhile for further study.

Overall, this study aims at seeking answers to the following issues:

- How is the historical evolvement of organizational concept?
- Having equipped with the knowledge about organizational theories, this study attempts to examine whether the conventional and quiet prominent bureaucracy theory is still adequate for present complex environment? If not, why is it no longer adequate?
- Is there any adequate approach that can reconcile diversified doctrines for better understanding of organizational behavior?
- Grounded in this adequate approach, how do we tackle organizational problems and verify that the criticisms relating to the weakness of bureaucracy theory are valid?
- Could the intervention framework verify that the proposed approach of understanding organizational behavior is plausible?

The next chapter introduces and explores the primary philosophical foundation that underpins the method of this research – the Peircian Epistemology.

Chapter 2 On Inquiring- A Peircian Epistemology

'Broad learning, careful inquiry, prudent pondering, clear distinguishing, steadfast practice'.
- The Doctrine of The Mean, 450 B.C.?

The purpose of this chapter is to discuss the thrust of questing for knowledge, i.e., inquiring. It serves as the track that guides this research to produce useful knowledge for understanding and for tackling organization behaviour. We will briefly review the Oriental principles (Confucianism), and some contemporary philosophers' work on inquiring. Through the comparative study, we conclude that knowledge is for the sake of pragmatism. The brief overview leads us to introduce the epistemology of pragmatism. The overview focuses primarily on C. S. Peirce's theory of knowledge and his Method of Science (MoS) – abduction, deduction and induction. We attempt to articulate these concepts to establish legitimate criteria of knowledge for the research to follow.

In addition, we will further illustrate Peircian MoS and appreciate its adequate scope of application. Finally, we subscribe to the Peircian philosophy of science that sees inquiring as an iterative process of doubt and belief. Belief, which might be plausible or reasonable, is tentative and serves as a foundation for new doubts. Thus these research results can only be seen as throwing a brick in the hope of getting a piece of jade in return. We hope that our efforts will motivate other eminent researchers to initiate new doubts, which in their turn will lead to new valuable beliefs.

2.1 The Quest for Universal Mind

The Greek Philosopher Plato believes that knowledge of divine as being implicit in every soul, but forgotten. The goal of philosophy is to free the soul from its deluded condition in which it is deceived by the finite imitation and veiling of the eternal. The philosopher's task is to 'recollect' the transcendent Ideas, to recover a direct knowledge of the true causes and sources of all things (see Tarnas, 1996, p. 41). For Plato, there exists universal

truth that inheres in all things. We need to be reawakening to and remember the forgotten knowledge. This though is very much alike to the ancient oriental Buddhism's doctrine in which human possesses universal characteristics, not ever increased or lessened. But the ancient wisdom advises us to reflect on our ideas so that we could proceed, accompanied by rigorous inquiring, to obtain luminous knowledge, which brings harmony to this world.

The above Confucian ideal illuminates the inquiring process and its objective. It starts with learning that is toward steadfast practice. Senge (1990) interprets learning through a Chinese character (see Figure 2-1). In addition to Senge's interpretation (Learning is as a child entering a school and a bird starting to learn to fly.), learning has certain meanings, which need to be further articulated. Firstly, learning implies a child's innocence, where discrimination does not exist. Secondly, learning connotes a child's modesty (Children have no arrogance). In a sense, an arrogant man is not able to learn because he believes that his knowledge has reached the utmost realm. It is like a cup filled with water where not a drop of water can be added. Then, grounded in the more extensive meaning of learning, we are able to absorb teaching and start to learn.

Broad learning implies 'erudite'. It reveals that erudition is the foundation of inquiring. But the acquired knowledge through broad learning might not be apposite. Thus, we should carefully inquire whether our learned knowledge is apposite. Yet, the result that we produce through inquiry might not be true. Thus, inquiry must be followed by prudent pondering and clear distinguishing. Prudent pondering activates the process of justifying whether the result of our inquiry is true. Prudent pondering connotes 'immersing'. 'Immersing' is 'thinking'. 'Thinking' does not ensure the achievement of enlightenment if it is not underpinned by 'distinguishing'. Without 'distinguishing' we are not able to discern whether we are clear about our 'thinking'. Finally, the objective of inquiring is for the sake of practice. After we clearly distinguish what is right and what is wrong through the 'immersing' process, we should steadfastly implement the right ideal. If we do not implement the produced knowledge, the inquiring will not contribute to our lives in any meaningful way. For instance, we know that we should not despise other people. However, our 'knowing' is not useful if we do not implement it.

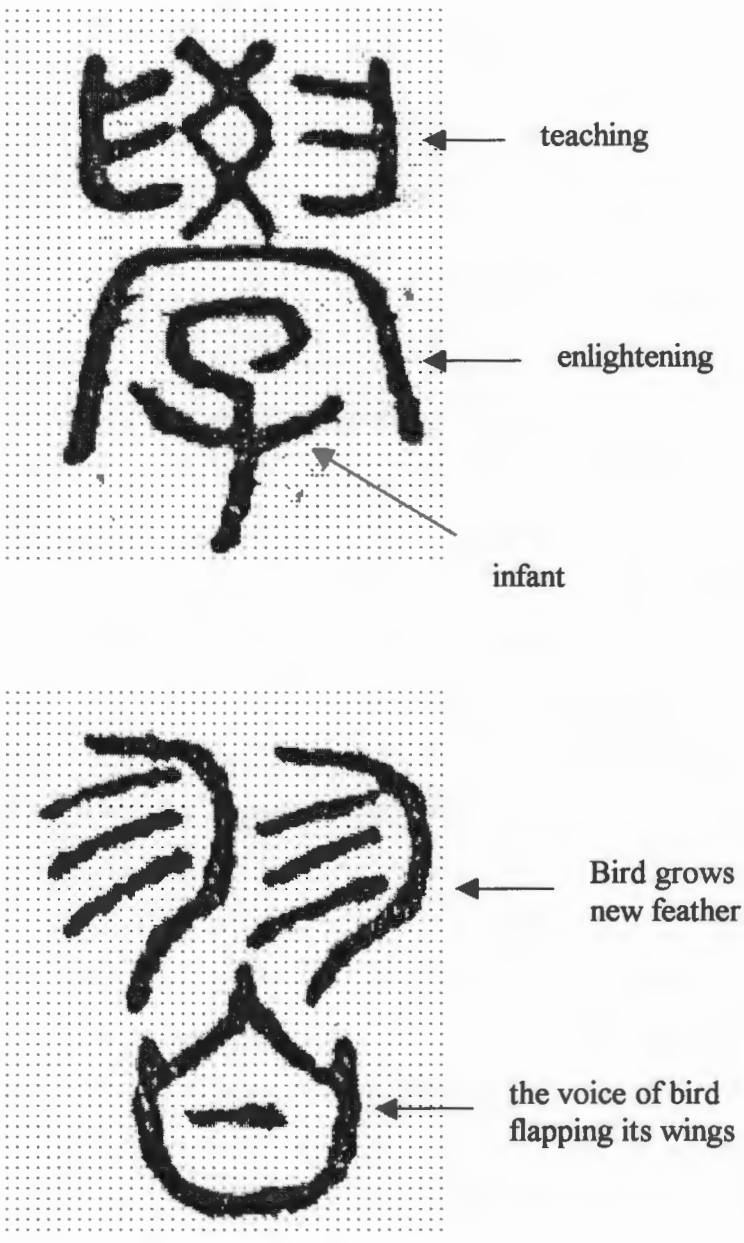


Figure 2-1: The Chinese Character of Learning

Churchman (1971, p. 10) also talks about the purpose of inquiring. He says that inquiring is an activity for producing knowledge, which is the ability of a person to 'do' something 'correctly'. According to Churchman's argument, the produced knowledge should contain more than just newness. It should have the propensity to help us to do something in a 'right' way. Therefore, the objective of seeking knowledge is also for the sake of practice.

For Peirce (see Reilley, 1970, p. 20), knowledge which should have no possible bearing upon any future experience – bring no expectation whatever – would be information concerning a dream. The future experience implies practical consequences, which concern the outcome of performed actions. Hence, knowledge should enable us to take actions and to predict the consequences of actions. The consequences of actions, in turn, can contribute to the acquiring of new knowledge. Cook and Brown (1999) call the interplay of 'knowledge' and 'action (knowing)' as 'generative dance'. They argue that knowledge is as something that people possess. It is a tool for knowing. Knowing as action calls for an 'epistemology of practice'. The interplay of knowledge and knowing can generate new knowledge and new knowing. Thus, from a realistic point of view, inquiring should be able to generate useful knowledge which enables us to take actions to leave perplexity. Furthermore, the influence of practices on consequence should be expectable.

By comparing Confucius' words with the western ideas, we espy that inquiring is to pursue useful knowledge, which can be implemented, i.e. for the sake of practice. 'Useful' knowledge ensures helpful 'action' or 'potential action' in any given circumstances. The bearings of actions on a perplex situation should be expectable, despite not fully expectable.

Inasmuch as inquiring is for the acquiring of useful knowledge, how do we acquire this useful and correct knowledge? If we were to rephrase this question for the purposes of this research, we could say: How do we produce useful knowledge about organization science, so that we can use it to intervene in the problems of bureaucratic organization?

To answer this question, we need a brief overview of some prominent theories of knowledge which profoundly influence our approaches of dealing with problems.

2.2 Some Lofty Epistemologies

Discussion of the different schools of thought on the theory of knowledge is a task of considerable daring, in that one runs the risk of over-sampling or of omitting the important features of these lofty philosophies. However, Churchman (1970, p. B40) points out two philosophical traditions of science that are commonly accepted by most scientific communities as the origin of scientific method: rationalism and empiricism. Rationalism seeks the truth through innate reasoning, whereas empiricism seeks the truth through external observation. At a later date, Churchman (1971) illustrates further remarkable theories of knowledge, which include the Kantian inquiring system, the Hegelian inquiring system and the Singerian inquiring system.

Rationalism asserts that truth is discovered through innate reason and through self-evidence, rather than through sense experience or universal certainty. Churchman (1971, p. 34) explicates this concept in terms of 'no inputs'. He elucidates that rationalism begins inquiring with clear and distinct ideas, which are not 'inputs'. The interpretation connotes that the control of the origination of the material of the inquiring system lies innately. Two components are essential for rational inquiry – the capacity to identify sentences and the application of the fundamental law of logic for processing the material. Logic is used to examine whether a sentence is tautological. Through the operation of logic, a 'fact net' is developed towards unveiling the truth. Moreover, for rationalism, the guarantor is God. God plays not only the role of the guarantor of the convergence of the nets of contingent truths, but He also stands for the ultimate object of all of the activities of the inquiring systems. Only God perceives the world with perfect clarity.

In contrast, empiricism affirms that all knowledge is based on experience, and rejects the possibility of *a priori* thought. The experience originates from receiving information and combining pieces of information by logic operators. Churchman (1971, p. 99) refers to the 'receiving' activity as 'input'. The 'input' is received by our five senses. A sensation does not exclusively imply 'seeing'; it also includes the other sensations, such as

'hearing' and 'touching'. Through our sense organs, the 'input' is then added to some basic properties from a list, called by Lock the 'simple sensations'. The basic properties are created through the community's consensus. For example, the label 'red' is determined to be 'red' because the community has broad agreement that it is 'red'. Thus, the empiricism inquirer has a memory with categories that can associate the 'input' with the stored items. We can see that the empiricism inquiring system consists of experiential observation and agreement, where simple logic operation comes into play.

Now the question is, could we use only rationalism's fundamental law of logic and innate reasoning to obtain knowledge to discover truth, such as to discover the truth about organization behaviour? Churchman (1971, p. 33) points out the problem of rationalism's inquiring system. The problem is that we are not able to control the process as a result of the proliferating 'fact net'. This implies that we do not know when we can draw conclusions in the 'fact net'. Interestingly, the British poet, Alexander Pope[1] said:

'For to say truth, whatever is very good sense must have been common sense in all times; and what we call Learning, is but the knowledge of the sense of our predecessors. I fairly confess that I have served my self all I could by reading; that I made use of the judgement of authors dead and living; that I omitted no means in my power to be inform'd of my errors, both by my friends and enemies. But the true reason these pieces are not more correct, is owing to the consideration how short a time they, and I, have to live?'

The poem reflects that if we were to live long enough, we would perhaps see the fruitful result in the 'fact net'. It seems that drawing a conclusion through innate reasoning to unveil every detail of a complex world phenomenon lies in the indefinite future. For instance, it is still impossible for us to understand completely the human brain in order to understand human behaviour, so that we can illuminate organization behaviour. There are many great mysteries about the human brain, which can not be unraveled simply by using logic. Therefore, in some circumstances, it is inadequate to rely exclusively on logic and innate ideas to understand complex phenomena. In addition, Churchman argues the 'uncertainty of the guarantor' of rationalism. He says: 'Indeed, we might plausibly argue that in a strongly non-separable world, all contingent facts are equally uncertain. The

[1] ALEXANDER POPE (1688-1744). (Butt, 1963, pp. xxvii-xxviii.)

existence of God is as certain or uncertain as the correct means to bring about world peace.' For Churchman, there is a need to establish the faith of the Leibnizian inquirers to supply the gap between man's ability to perceive and perfect clarity.

As a result, experiential observation or sensation is required to complement a human's limited capacity for 'innate reasoning'. As Kolb (1984, p. 38) says: 'Learning is the process whereby knowledge is created through the transformation of experience'. But Mitroff and Linstone (1993, p. 39) question Inductive-Consensual, an empiricism's way of knowing, and point out while agreement, experts, facts, or observations are important, the view of them presented by Inductive-Consensual is serious flawed. They argue, for instance, empiricism's view on the existence of pain, sounds, tastes and etc. are too forceful, too strong that they can neither be confused nor doubted. There are no simple or basic sights, sounds, tastes, smells, sensations, or touches that humans can experience without error or social influence. As a result, there can be no faith associated with the sense data themselves. According to Mitroff and Linstone's views, the empiricism simply go on creating pictures of the world as they sense the world. The appearance becomes an illusion once the Lockean inquirer sees that his 'pure' inquiry rests on an agreement among members of a community.

The same problems happen with Kantian inquiring. For Kant, the existence of an input system capable of receiving data implied that the inquiring system had built into it certain *a priori* sciences. These sciences are an *a priori* elementary Geometry, Arithmetic and Kinematics. However, Churchman points out that how the inquiring system validates the assertions of these *a priori* sciences is an unanswerable question. Besides, how does the self-examination of the inquirer determine the correct Arithmetic and Geometry?

Geoffrey Warnock (see Magee, 1987, p. 178) also questions whether spatial and temporal concepts are really limited to geometry and arithmetic. Mitroff & Linstone (1993, p. 60) indicate various professions in effect have different 'computers'. The boundaries between professions are the differences between the 'categories' they use to 'structure' the problems they treat. While the same wine is poured into different wine glasses, the shape of the wine is different. These questions suggest a gap in Kantian epistemology. For

Churchman, Lockean and Kantian inquiries require a faith in the existence of agreement, since they cannot empirically establish its existence.

On the other hand, Hegel's design, opposite to Locke's, by means of *Weltanschauung* and counter-*Weltanschauung* disagreement, leaves unanswered questions whether such a procedure gets us anywhere. In order to attain an objective viewpoint, one must search all the ramifications of mind and objectivity and this is a costly and time-consuming process. As Magee (1987, p. 193) points out, the actual direction of change taken by dialectic is indeterminate, the unpredictable outcome of innumerable random conflicts. Peter Singer (see Magee, 1987, p. 193) stresses the goal for Hegel is the greater development of mind towards 'freedom'. It is a process of increasing awareness of freedom, and of increasing knowledge of ourselves. The dialogue between Magee and Singer shows that incessant conflicts are to pursue our freedom, and time seems not a concern in Hegel's inquiring system. Thus, for Churchman, Hegel's process of learning one's own mind belongs to the 'leisure class', where time and cost are of no concern.

For Churchman, all the above are teleological. A grand teleology with an ethical base is the Singerian method of inquiry, of which the guarantor is of heroic mood. The heroic mood connotes 'progress', which is our courage to abandon comforts for a kind of cold darkness. The progress can be seen as an endless process of refinement. To Singer, the tactical lesson seems clear: whenever all readings are identical, then the inquiring system must shift to a higher level of refinement. The rule is applied until the system reaches a level of refinement in its readings where not all readings agree. Thus agreement is a beginning point for the 'hero' to make progress. In terms of data and hypothesis, when data and hypothesis are mutually compatible, then it is the time to rock the boat to encourage dissent. To Singer, the language of an inquiring system should be a departure from the imperative predicate 'is'. The 'is' agreement cannot help us to learn what has yet to be learned. Instead, an 'ought' statement provides incentive, which in turn enables us to learn. Besides, 'ought' is a more ethical statement, which does not block uncertainties.

Singer's concept of progressively refining knowledge can be traced back to the inception of pragmatism. The American philosopher, Charles S. Peirce, founder of pragmatic

epistomology, asserts that knowledge is accumulated through a continuous refinement process. The refinement process is manifested in the Peircian epistemology in which the Method of Science (MoS) - comprised of abduction, deduction and induction - acts as a thrust to acquire knowledge. The interplay of the three phases enables us to seek the ultimate philosophy, although we cannot attain it (see Peirce, 1868b, CP 5.265). The Peircian inquiring process manifests 'ought' instead of 'is'. That is the inquiring process provides tentative belief and incentive, which drives a heroic mood to rock the boat and to encourage 'progress'.

Peircian epistemology and his method of science (MoS) have profoundly influenced the research of science. This study is grounded in Peircian epistemology. For it is helpful to us to solve problems realistically in management science. His epistemology and MoS will be briefly introduced in the next section for establishing criteria to guide this research.

2.3 The Peircian Epistemology and Method of Science

In this thesis pragmatism connotes Peircian philosophy, though in the 1900 Peirce renamed his doctrine 'pragmaticism' to distinguish his position from that of James, Schiller, etc. (see Misak, 1991, p.3).

Charles Sanders Peirce (1839-1914), born in Cambridge, Massachusetts, U.S.A., was an extraordinary genius in both science and philosophy. His proficiency in science was not limited to the organized studies of Physics, Chemistry, and Geology, but also included an appraisal of the procedures used by those who were successfully advancing knowledge (Reilley, 1970, p. 1). Inquiry and its methods were the main objects studied by Peirce. Unfortunately, very few of Peirce's works were published. Scholars have been integrating and interpreting his fragmented notes and papers into a coherent whole.
Though the interpretations of Peirician epistemology are dependent on each scholar's interest and perception, few people would doubt that the spirit of pragmatism is manifested on its maxim. Grounded on its maxim, the lofty pragmatic philosophy flourishes and profoundly affects our way of dealing with issues. This chapter starts with

pragmatism maxim which directs this thesis to intervene in organization problem.

2.3.1 Pragmatism Maxim

At the outset of this chapter, pragmatism maxim has been implicitly revealed; i.e., knowledge should enable us to take actions and to predict the consequences of actions. William James explicitly explains this concept (see Mautner, 1996, p. 286). He credits Peirce with the Pragmatic Maxim, 'to attain perfect clearness in our thoughts of an object, then, we need only consider what conceivable effects of a practical kind the object may involve – what sensations we are to expect from it, and what reactions we must prepare. Our conception of these effects ... is then for us the whole of our conception of the object'. Misak (1991, p. 4) articulates the spirit of pragmatism maxim in terms of 'a person does not have a complete grasp of a predicate F if he is unable to say what would be the consequences of hypotheses of the sort "a is F"'.

As such, Misak (1991, p. 6) further puts forward two perspectives to interpret pragmatism maxim. The two perspectives are 'adequacy of hypothesis' and 'adequacy of understanding'. 'Adequacy of hypothesis' is whether a hypothesis can produce different expectation in contrast to the existing situation. In a sense, it implies a hypothesis, which has no consequence, is illegitimate. For they assert nothing that can conflict with the way things are. This type of hypothesis is described as 'devoid' or 'empty' (Peirce calls them pragmatically meaningless). The second view (adequacy of understanding) is whether we understand the consequence of a hypothesis. If someone knows the meaning of a hypothesis, she must be able to manifest knowledge of those consequences. For if a hypothesis is about anything her understanding, it cannot merely be a matter of thinking that she knows what it means. As a hypothesis claims understanding about the world, there will be some consequences for the world.

Through William Jame's concept and Misak's articulations of pragmatism maxim, the characters of pragmatism maxim can be summarized in 'effect' or 'prediction'. The prediction is a prelude to 'action'. In terms of 'effect' or 'prediction', the influence of a proposition onto the world should be expectable. Let's use an example to illustrate this notion. Einstein and Infeld (1938, p. 122) explain the declines of mechanistic view. They

point out 'in the old theories of electric fluids, in the corpuscular and wave theories of light, we witness the further attempts to apply the mechanical view. But in the realm of electric and optical phenomena we meet grave difficulties in this application. .... Waves spreading in a medium consisting of particles, with mechanical force acting between them are certainly a mechanical concept. But what is the medium through which light spreads and what are its mechanical properties? There is no hope of reducing the optical phenomena to the mechanical ones before this question can be answered. But the difficulties in solving this problem are so great that we have to give it up and thus give up the mechanical view as well'. Owning to the inadequacy of mechanistic perspective on explaining light wave spreading, Einstein and Infeld's illustrations show that the flourishing field concept, from which the theory of relativity arises, helps us to understand optical phenomena by a more adequate notion. They stress (ibid, p. 244) 'the field concept proves most successful and leads to the Maxwell's equation describing the structure of the electromagnetic field and governing the electric as well as the optical phenomena'.

Einstein and Infeld's illustration reflect that a flourishing concept (field concept), displacing old notion (mechanical view), enables us to understand or expect the behaviour of light. And the expectation differs from the existing situation (mechanical view). On the basis of field concept, the derived Maxwell's equation provides us preparation to react to the electromagnetic phenomena.

As our discussions, the pragmatism maxim reflects progressive improvements of our understanding of the world phenomena. It is a process of continuous refinement of knowledge, from an old and unsuitable belief (beginning of doubt) to a new and suitable belief (settlement of opinions). The process involves how we intercept phenomena, represent them in our mind and produce useful knowledge. These issues are discussed progressively in the following sections.

2.3.2 Peirce's View on Fixation of Belief

Doubt and Belief – Anti-Cartesianism

For Peirce, inquiring is an iterative process between doubt and belief. Peirce (1877, CP

5.372) says that doubt is an uneasy and dissatisfied state from which we struggle to free ourselves in order to pass into a state of belief. For example, in management practice, doubt could be provoked owing to unsatisfactory organization performance. In contrast, belief guides our desires and shapes our actions where doubt never has such an effect. For example, belief could be the catalyst in the intervention in an organization problem. However, Peirce is opposed to Descartes' teaching of 'universal doubt'. Peirce (1868b, CP 5.265) writes that 'we cannot begin with complete doubt. We must begin with all the prejudices, which we actually have when we enter upon the study of philosophy'. As such, Peirce (1877, CP 5.376) points out that an inquiry has only to start with propositions perfectly free from all actual doubts. The propositions can be called indubitable propositions. Our common sense is an indubitable proposition. For example, we all know that a verbal offence can easily provoke conflict. We all know that a coercive and dominating management style could eventually lead to the rebellion of the shop floor staff. These indubitable propositions can serve as foundations for us to progress to the settlement of opinions. However, when we are no longer satisfied with the settled opinions, doubt leads to the seeking for a new state of belief. Peirce terms the struggle to attain a state of belief, departing from the irritation of doubt, as *inquiry*.

Four Methods of Fixing Belief

Having described the struggle from doubt to belief as the settlement of satisfactory opinions, Peirce points out that four methods are available for fixing belief. The first three methods are not sustainable in the long term. Peirce (1877) writes that the four methods are:

(1) The Method of Tenacity – It is an unshakable faith, in which convenience is greater than its advantage. For example, a person who believes that he will go straight to heaven, provided he has fulfilled certain simple criteria in his life, has this type of belief. As does a manager who immovably believes that through the practising of certain simple management techniques, the organization performance will be remarkably improved.

(2) The Method of Authority – It is the method of institutions that act as tenacious individuals for the whole community. For example, in the mechanistic age, the owner

of an organization has the power to mould the disparate beliefs of individuals into a single belief consistent with his own. The members see the owner's will as their will.

(3) The Method of *A-Priori* – It is a method that settles opinion via propositions guaranteed by the light of reason. An example of this is an argument that proposes that a government invest money to improve infrastructure, in order to curb economic recession, because the reduced unemployment rate can initiate market activities. In turn, the market activities will bring more money to the government for investment.

(4) The Method of Science (MoS) – It is the method of fixing belief with the most prerogative. It covers the methods of fixing belief in accordance with experience. We will come back to this topic in a later section.

To Peirce, the first two methods of fixing belief – tenacity and authority – are not sustainable because 'the social impulse is against it'. The third method – the *a-priori* method – is more respectable than the first two. However, it would invoke the natural inclination of people's 'taste' at a given time and place in the determination of the appropriateness of an application. Hausman (1993) interprets why Peirce rejects being solely dependent on the *a-priori* method's self-consistency. Hausman says that Peirce is concerned with empirical knowledge, or belief that bears on actions. Thus, a method that is essentially a demand for self-consistency would still need to be applied to experiential consequence; i.e., it would be tied to experimental results, at least in a loose sense of experiment in the context of commonsense attempts to settle opinion. For instance, the foregoing example in the third method of belief can be challenged by our experience, which shows that the return to scale of investment on infrastructure would not be our expectation, because some experiential facts show that the return would be hampered for a number of reasons, such as the low quality of the building industry. Thus, we can see the importance of experience in the Peirican MoS of fixing belief, where logical reasoning structures the 'input' experience. Together they shape '*a-priori*' knowledge for the settlement of opinions.

2.3.3 Peirce's Phenomenology and Semiotics

Peirce's Ontological Categories

Peirce defines phenomenology as the study of what seems, rather than as the statement of

what appears. For Peirce, it is the doctrine of categories, whose business it is to unravel the tangled skein of all that in any sense appears and to wind it into distinct forms; or in other words, to make the ultimate analysis of all experiences the first task to which a philosopher has to apply himself (see InteLex's CD ROM CP 1.280 and CP 2.197).

The foregoing interpretation of phenomenology by Peirce reflects that every entity has its own individuality. This argument encompasses the means whereby we experience a phenomenon. As a result, Peirce puts forward three ontological categories:

(1) Firstness – Hausman (1993) interprets that the first category is that element of any phenomenon that gives it its character, independently of anything else. In a sense, it is independent of any other phenomenon and any other character. It is the concept similar to 'monad'. For Peirce, a pure monad is as a pure nature, or quality, in itself, without parts or features and without embodiment. The meanings of names of 'secondary' qualities are as good approximations to examples of monads as can be given. Peirce illustrates that among phenomena there are certain qualities of feeling, such as the colour of magenta, the odour of attar, the sound of a railway whistle, the taste of quinine, the quality of the emotion upon contemplating a fine mathematical demonstration, the quality of the feeling of love, etc. Peirce does not mean the sense of actually experiencing these feelings, whether primarily or in any memory or imagination. That is something that involves these qualities as an element of it.

We can see that firstness hinges on our feeling of a pheneron. (Peirce gives the name 'pheneron' to the collective total of all that is in any way or in any sense present to the mind, quite regardless of whether it corresponds to any real thing or not.) The feeling is constituted by elementary feature, which has no parts. Thus, firstness is an abstraction. It must at least be something conceived and it can be felt. For example, our feeling about a person, whether generous or ungenerous, is an indivisible and immaterial feature. In organization science, our feeling about organization, whether as an organism or cultural entity, is an unpartitionable monad. This feeling remains at the aesthetic level. It is not 'describable'. In a sense, firstness can be seen as the starting point of our hypothesis of a world phenomenon.

(2) Secondness –is that indecomposable element of a phenomenon that relates it to something else because of its dependency on the other thing. Peirce uses 'struggle' to connote the 'relating'. 'Struggle' means mutual action between two things, regardless of any sort of third or medium, and, in particular, regardless of any law of action. It is the dyadic nature, whereby the relation that all phenomena manifest with respect to secondness is a relation in which one thing is connected with another independently of any other, or any third, thing. The causal relation can exemplify the character of the secondness. For example, the feeling of tenderness entails the feeling of love. The feeling of love, by its existence, makes the feeling of tenderness its creator. In this instance, no third element is involved. Likewise, in organization science, our feeling of organization as a machine could be related to our life, which embodies a large number of mechanistic activities. Or, it could be related to the mechanism metaphor, which has been applied to science over the past years.

The singular syllogism can be seen as a dyadic relation: 'every ***M*** is a ***P***, every ***S*** is an ***M***; hence, every ***S*** is a ***P***'. For example, 'the decreasing of revenue can cause retrenchment; retrenchment can cause recession; therefore, the decreasing of revenue can cause recession'. Through the interacting of the dyad, we gradually deduce the claim.

(3) Thirdness – is the category of triads. Peirce interprets thirdness in the following way: 'By the third, I mean the medium or connecting bond between the absolute first and last. The beginning is first, the end second, the middle third. The end is second, the means third' (see InteLex's CD ROM, p. 452). Hausman (1993) articulates that thirdness can be seen in light of the consideration of sign situations. A genuine sign process includes an interpretant that is a third relative to an object and the sign or representamen. The interpretant can be seen as what Peirce calls the 'connecting bond'. Peirce's example of '*A* gives *B* to *C*' is a triadic relation. Giving is a relation that relates three things or objects. The triadic relation is irreducible. As we reduce it to dyad, we lose the meaning of relation. For example, the foregoing example could not be reduced to '*A* puts down *B*' then '*C* picks up *B*'. The dyadic relation could not manifest the meaning of *giving*. Hookway (1985) interprets that we cannot prescribe

giving from the three participants in the *giving*. We cannot focus on the giving, while banishing from our mind any thought of a giver, a recipient and a gift.

Peirce claims that the *irreducible* notions may include law, thought, intention, meaning and continuity. These notions are recognized as irreducibly triadic. For example, in organization the irreducibly triadic relation can be exemplified by information transmitting. The conveying of information cannot be disconnected from a *sender*, a *receiver* and the *transmitted information*.

Statistical inference can be seen as a triad. It involves the *sample*, *population* and *data*. Through the sampling of *information*, we can make an *inference* about the population. We could not consider only the sample and the population without considering *what* is inferred.

Peirce's three universal categories constitute the order of our experience of a phenomenon. Only the thirdness involves meaning. Hausman (1993) summarizes that symbols presuppose indexes and icons and, with respect to categories, that secondness, simple two-term relation and reaction, presupposes firstness, something to be related and to be present, ready to act and react. Accordingly, thirdness presupposes secondness and firstness. Thus, triads presuppose dyads and monads. Nevertheless, neither dyads nor monads are sufficient to perform the function of triads.

Peirce's Semiotic Process

Peirce articulates the meaning of 'semiotic' as follows: 'Logic, in its general sense, is ... only another name for semiotic, the quasi-necessary, or formal, doctrine of signs' (see InteLex's CD ROM, p. 1393). Thus, for Peirce, semiotic process is a doctrine of sign, in which logic structures our thought. This concept is reflected in Peirce's papers: 'Some Consequences of Four Incapacitates Claimed for Man' and 'Question Concerning Certain Faculties Claimed for Man'. Peirce (1868b, CP 5.213) proposes that a thought is translated and interpreted in the subsequent one; in other words, any cognition is determined by the previous cognition. It connotes that thought is a continuous process, like a train of mutually-linked carriages. The end of the carriage signifies 'death', where

we cease our thought. Thus Peirce denies that we have the power of intuition or introspection. But all knowledge of the internal world is derived by hypothetical reasoning from the observation of external fact. For example, to understand a man's emotion, we cannot exclude the outward things that influence his emotion and must ask what external factors make this man unhappy. A person, the weather or an event?

Besides, we have no power of deriving our thinking without 'sign'. The 'thinking' here denotes the third state of mind. The first state of mind is *feeling*, which corresponds to 'monad'. The second state of mind is *reaction*, which involves two things acting on each other. This state of mind corresponds to 'dyad'. The third state of mind is meditation, which conveys to a mind an idea about a thing. Insofar as it does this, it is a *sign*. We can see that the third state of mind involves three parts: the *thing* (*object*), *meditation* (*thought*), and *idea* (*interpretation*). Thus, the third state of mind is triadic and can produce meaning.

Peirce classifies 'sign' with respect to the ways distinct kinds of things function semeiotically. Accordingly, he divides 'sign' into 'trichotomy'. The first trichotomy is the sign itself. The second trichotomy is a sign that relates to its object. The third trichonomy is the way that an interpretant represents the thing in relation to making the world intelligible. The second trichotomy is most important for our purposes. We will therefore discuss it further.

Peirce divides the second trichotomy of signs into three universal categories (see IUPUI's web page):

(1) Likeness (icon) - which serves to convey ideas of the things they represent simply by imitating them. For example, the metaphorical imagination of organization is a sign of likeness. Is organization like a machine, an organism or a brain? Likeness is the first order of our thinking and provides us with pictorial ideas.
(2) Indication - Anything that startles us is an indication, insofar as it marks the junction between two portions of experience. Thus a tremendous thunderbolt indicates that something considerable has happened, though we may not know precisely what the

event is. But it may be expected to connect itself with some other experience. In organization science, an organization's inherent nature of maintaining the variables at a desirably steady state may indicate that that organization has the same attributes as an organism.

(3) Symbol - means 'a thing thrown together'. It is usually said that in the word 'symbol', the throwing together is to be understood in the sense of 'to conjecture'. For example, 'marriage' might signify 'love'. In organization science, the analogy mapping that shows the relationship between organization and a metaphorical entity can be seen as a symbol of conjecture.

Here, again, we can see the triadic nature of the second trichotomy of sign. The three orders in sequence are *feeling*, *reaction* and *association*. The association of ideas contains feeling and reaction. The three kinds of signs are the adequate language for articulating reality. In brief, the Peircian theory of phenomenology and semiotics provides us with adequate ways of experiencing and interpreting world phenomena, on which the method of science is established. A discussion of the Peircian MoS follows.

2.3.4 The Peircian Method of Science

Based on his concept of fixing belief, phenomenology and semiotics, Pierce on the one hand argues that hypothetical reasoning from experiential observation is the source of knowledge. On the other hand, he also emphasizes that a logical and rigorous procedure is imperative for guiding us to reach a conclusion. Peirce takes both of the essential components into account and brings forward a scientific method that consists of three phases: *abduction*, *deduction* and *induction*. Abduction is to suggest a plausible hypothesis to explain observed phenomena. Deduction is the use of logic to reason a prediction based on plausible premises. Induction quantitatively verifies whether a hypothesis is true. For Pierce, an inquirer should apply the interwoven three stages to attain a comprehensive inquiry. The three stages are illustrated as follows:

- *Abduction* is to suggest a hypothesis that can explain the observed phenomena in terms of prediction. Peirce (1868b, CP 5.276) defines 'hypothesis' as 'an argument which proceeds upon the assumption that a character which is known necessarily to

involve a certain number of others, may be probably predicated of any object which has all the characters which this character is known to involve'. His definition indicates that 'hypothesis' is the seeking for a behaviour pattern or invariant features of the observed phenomena, to recommend inferences on a class of objects. Therefore, abduction is essentially an explanatory speculation, rather than a symbolic formulation. The explanatory argument could originate from clue, metaphor, scenario or explanation (see Shank's web page). Its objective is to create our concept of predicting the observed phenomena. For instance, traffic flow might be abducted as fluid flowing in a pipe. This abduction is created through metaphor. Abduction through clue can be exemplified by the process of archaeological research. An archaeologist observes an antique metal container and finds silver condensation in the inner part of it. Are there any connections between the two, or it is just a coincidence? He might look at the exterior of the container and find burned substances. Then, he can abduct that the container was used for melting silver. This hypothesis is reasoned through clue.

The above examples hint that there may be more than one persuasive hypothesis. However, we choose the plausible ones to test. Thus, abduction also involves a reduction of many speculations to one, or at least to fewer than before. For instance, considering the traffic flow example, we might abduct that the traffic flow is like 'air flow'. But it seems less appropriate compared to the 'fluid flow', because the lesser friction force in the airflow might not be able to explain the traffic jam.

Peirce uses a simple syllogism of rule, result and case to demonstrate abduction. For example:

Rule - All the beans from this bag are white.
Result - These beans are white.
Case - These beans are from this bag.

In management practice, hypothesis can be seen as our speculations about the grounds for unsatisfactory organization performance. The template of rule, result and case can be exemplified by the following instance:

Rule - According to Ashby's (1956) Law of Requisite Variety, a regulator of a device must have at least equal varieties to its environment so that the system can be maintained at any desirable state.

Result - The system variables of organization *X* deviate from a desirable state.

Case - It is likely that organization *X*'s regulator (management) does not have the requisite varieties.

Being testable is an important requirement of a hypothesis, (Reilley, 1970, p. 38). In addition, test costs (including time and finance) are also important factors that should be considered during hypothesis testing. A good test should start from the hypothesis of least cost and least time. These assertions connote that a useful hypothesis is based on the testable premise.

- *Deduction* is to examine a hypothesis and make inference through logical reasoning. Its purpose is to explicate the hypothesis by drawing logical consequences from premises. The conclusion is true, given that the premises are true as well.

Peirce says (see InteLex's CD ROM p. 135) that: 'Deduction is that mode of reasoning which examines the state of things asserted in the premises, forms a diagram of that state of things, perceives in the parts of that diagram relations not explicitly mentioned in the premises, satisfies itself by mental experiments upon the diagram that these relations would always subsist, or at least would do so in a certain proportion of cases, and concludes their necessary, or probable, truth'. Pierce (1869) explains deduction through syllogism. His explication is as follows:

S is *M*; *M* is *P*:
[*Ergo*,] *S* is *P*.

For instance:

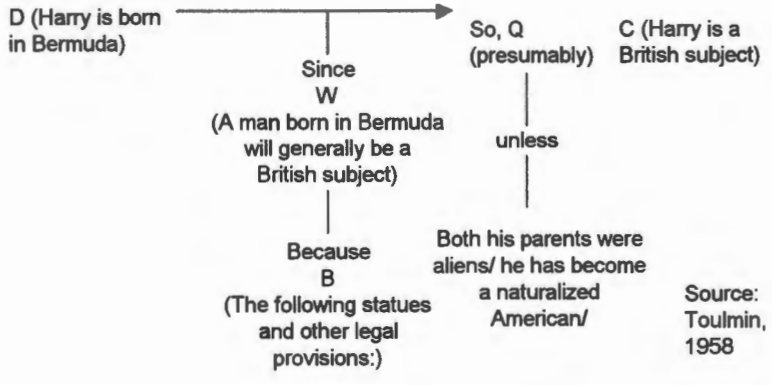
Aristotle is a man;
A man is a mortal:
[*Ergo*,] Aristotle is a mortal.

Another example:

Car is heavier than book;
Book is heavier than feather:
[*Ergo*,] Car is heavier than feather.

The validity of this type of syllogism is subject to a transitive predicate, such as 'heavier', 'longer', 'included in', 'precedent', 'aggravate' and so forth. In addition, if the premises are not true, the claim is not true. For example, if Aristotle is not a man, then he is not a mortal. However, if the premise is probably true, the conclusion is also probably true. For instance, 30% of South African civilians have not been overseas. David is a South Africa civilian; therefore, there is a 30% probability that David has not been overseas.

Toulmin (1958) suggests a more complicated logical reasoning. Toulmin's suggestions can be applied to abduction and induction too and not confined to deduction. The argument comprises datum (D), warrant (W), backing (B), qualifier (Q), rebuttal (R), and claim (C). Fletcher and Huff (see Huff, 1990) interpret that 'datum' may include facts, common knowledge or opinion from an authorized source. Warrant is the reasoning, which leads us to draw a conclusion. Backing is like a legal foundation that supports our warrant. Qualifier is the level of confidence about our conclusion; e.g., our conclusion is certainly true or might be true. Rebuttal is the excluding condition of our conclusion, such as the assumption of an empirical equation. For example, Newton's Law of Motion (F=ma) is valid only under the condition of no friction force. Thus friction force is a rebuttal of Newton's law. Finally, claim is the conclusion of our deduction. We can see that Toulmin's argument takes rebuttal into account to complement the traditional syllogism. It helps us to examine the validity of our argument, i.e., to check whether we are ignoring certain conditions that can render an argument invalid. Toulmin's layout of an argument can be exemplified as follows:



Peirce uses the syllogism of rule, case and result to demonstrate deduction. For example:

Rule - All the beans from this bag are white.
Case - These beans are from this bag.
Result - These beans are white.

In management practice, deduction can be seen as the reasoning why our speculation about the causes of a problem can hold. Moreover, we suggest a plan to intervene in the problem. The template of rule, case and result can be exemplified by the following instance:

Rule – According to Ashby's (1956) Law of Requisite variety, a regulator of a device must have at least equal varieties to its environment, so that the system can be maintained at any desirable state.
Case – Organization *X*'s regulator (management) does not has requisite varieties.
Result – Organization *X*'s system variables would deviate from a desirable state.

Cumulatively, deduction is reasoning in order to explain our hypothesis. It gradually evolves on the basis of logic. Through logical reasoning, we develop the theory to understand some phenomena. The theory is not grounded in pure guesswork, but is guided by reasoning or causal logic (see InteLex's CD ROM p. 638, Sutton and Staw, 1995, p. 373).

- *Induction* is defined by Pierce as 'an argument which proceeds upon the assumption that all the members of a class or aggregate have all the characters which are common to all those members of this class concerning which it is known, whether they have these characters or not; or, in other words, which assumes that that is true of a whole collection which is true of a number of instances taken from it randomly', Pierce (1868b, CP 5.275). In brief, induction tests the random samples of a class and draws conclusions on the samples to infer the whole collection in order to approve, disapprove, or modify hypotheses. Peirce gives an example to illustrate induction. He

says that if we were to count the relative number of different letters in a certain English book, called '*A*', we would find that the relative number of e's approaches nearly 11 1/8 percent; the number of t's approaches 8 ½ percent; the number of a's approaches 8 percent and the number of s's approaches 7 ½ percent. If we were to repeat the same observation with half a dozen other pieces of English writing (say *B, C, D, E, F* and *G*) we would have a similar result. Then, we may infer that in all English writings of some length, the different letters occur with nearly those relative frequencies. The validity of this argument depends on our not knowing the relative occurrence of letters in any English writing except *A, B, C, D, E, F,* and *G*. If we knew a result in *H* and this result were not nearly the same as that of the others, the conclusion would be refuted. If the result were the same, then the inference would be valid for *A, B, C, D, E, F, G* and *H*, rather than for the first seven alone. Peirce's example shows that the characters of the random samples of a class can be used to infer the whole class. Besides, the significance of the sample grows in strength as the testing process goes on and it may entail an increased approximation to the truth in the long run.

Peirce uses the syllogism of case, result and rule to demonstrate induction. For example:

Case - These beans are from this bag.
Result - These beans are white.
Rule - All the beans from this bag are white.

In management practice, induction can be seen as verifying our speculation about unsatisfactory performance through monitoring the implementation of a proposed plan (In this thesis, verifying implies to examine whether a theory is 'adequate'. A stronger sense means whether a theory is 'conclusively right'; see the next section). The template of case, result and rule can be exemplified by the following instance:

Case – Organization *X*'s regulator (management) has been rectified to achieve greater varieties.

Result – Organization *X*'s system variables have been restored to a desirable state.

Rule – An organization's regulator needs requisite variety to cope with the varieties of a situation.

The reason that we draw random samples to infer the whole class is that, in some circumstances, we are unable to test the whole collection to verify hypotheses, because of the limitation and dwindling of our resources. For instance, if we intend to check every person of a country to conclude the percentage of people who are infected with AIDS, it not only entails a lot of money, but also a lot of time and manpower. Additionally, certain objects are irrevocable after they have been tested. For example, after an oil seal is tested to examine oil resistance, it will not be recoverable. A bearing will be worn out after it has been tested to examine durability. In addition, testing of the whole collection to verify hypotheses is very costly. Hence, Peirce contends that we do not need to know everything in order to know something. We only need to know the character of random samples to infer whether the hypothesis is valid or the hypothesis is still dubious or whether we should modify the hypothesis. As such, the objective of induction is to test a portion of the class to make inferences on the class and to verify the hypotheses.

Through this brief discussion of the Peircian MoS, we can see that the three phases must be geared as coherent activities to elevate our knowledge. By the interaction of abduction, deduction and induction, we could gradually access reality. However, although through the interplay of the three phases we can acquire new knowledge, each stage has its critical aspects that we should pay attention to when we use them for inquiring. In the next section, further appreciations of the three phases are discussed.

2.4 Further Appreciations of Peircian MoS

Having introduced Peircian MoS, we need to further appreciate the adequate application and the produced knowledge of the three phases (abduction, deduction and induction). The appreciation provides this thesis a course to produce knowledge and avoid inappropriate application of MoS.

Abduction is established on the basis of repeatable test.

Carnap (1995, p. 245) stresses 'it does not have to be confirmed to be a hypothesis, but there must be correspondence rules that will permit, in principle, a means of confirming or disconfirming the theory. ... But if such tests are possible in principle, the theory can be called a scientific one. When a theory is first proposed, we should not demand more than this'. Obviously, according to Carnap's view, the premise that a hypothesis deserves to be called 'scientific' is testable or possibility of testing in the future. And the 'tests' are plural rather than single.

In the previous section, being testable has been stresses as an essential requirement to hypothesis. For an idea has to be tested to validate it. However, testing is not one-shot task. It requires samples for 'repeatable' testing, no matter what laws (empirical or theoretical law) the hypothesis intends to produce. As Carnap (1995, p. 227) says 'the scientist makes 'repeated measurements', finds certain regularities, and express them in law. These are the empirical laws'. We might question how theoretical law is proved. Carnap (ibid, p. 230) furnishes us with the answer. He writes 'how can theoretical law be discovered? ... It is stated not as a generalization of facts but as a hypothesis. The hypothesis is then tested in a manner analogous in certain ways to the testing of an empirical law. From the hypothesis, certain empirical laws are derived, and these empirical laws are tested in turn by observation of facts'.

As such, 'repeated measurements' and 'observations' are indispensable to justify both empirical and theoretical law. But the samples in some circumstances are quite few or costly. In such circumstance a long term testing seems not sustainable. As Reilley (1970, p. 39) writes that the choice of hypothesis for testing is preferably starting from the one of least cost and time. He implies that costly hypotheses should not be tested unless the test results of other hypotheses are disproved. Besides, the testing of hypotheses is not solely associated with the cost of testing hypotheses. It is also associated with the number of samples available to us for verifying hypotheses. If there are few samples available, the testing result of the hypothesis is less convincible.

For instance, 'balance of terror' is a theory that suggests a situation where two actors can

credibly threaten each other with destruction. This capability need not be total but should certainly be unacceptable to the parties concerned. Moreover, for the balance to be stable, neither side should be able to avoid the consequence of destruction by, for example, striking first without warning. The situation described as a balance of terror would be normally apply to states and has been taken specifically to refer to the relationship of nuclear deterrence between the superpowers and their allies. In principle, however, a balance of terror situation could be held to apply to non-state actors such as terroist groups (see Evans and Newnham, 1992, p. 27). If this theory is to be empirically verified, a certain amounts of 'nuclear weapons' should be 'balanced' distributed to the superpowers, their allies, their enemies, and terrorists and the terrorists' enemies. If the theory is successful at the first trial, provided that human are rational, we may claim the 'balance of terror' seems working thus far. But, if the first test is not successful, there might be no problem in this world anymore as the world might burn into ashes. The second test lies at infinite future.

Deduction is applied to transitive contextual relationship.

Deduction can logically make an inference through syllogism in a transitive context relation. For example:

A is heavier than *B*, *B* is heavier than *C*;
Hence *A* is heavier than *C*.

The validity of the above syllogism is that the premise must be true; i.e., ' A is truly heavier than B'. If A is not heavier than B, then the conclusion is refuted. Moreover, if the premise is plausibly true, then the conclusion is also plausibly true.

However, an intransitive contextual relation can lead to a faulty conclusion. An intransitive relationship means that the syllogism could not make an inference, owing to the intransitive character of the predicate, such as 'love', 'like', 'prefer' and so forth. For example, the following syllogism is faulty, owing to its intransitive predicate:

A likes *B*, *B* likes *C*;
Hence *A* likes *C*.

We can use some examples from daily life to illustrate this situation. For instance, we cannot claim that 'person "A" has a good friendship with person "B"; person "B" has a good friendship with person "C"; therefore, person "A" has a good friendship with person "C"'. We could not claim that 'country "A" has strong diplomatic ties with country "B" and country "B" has strong diplomatic ties with country "C"; therefore country "A" has strong diplomatic ties with country "C"'.

Moreover, the predicates such as 'see', 'hear' and 'understand' are not transitive either. For instance, Figure 2-2 portrays that 'A' can see 'B' and 'B' can see 'C' but 'A' cannot see 'C'. In a long information-transmitting channel, sometimes 'A' can hear 'B' and 'B' can hear 'C'; however, 'A' cannot hear 'C'. Moreover, if 'A' can understand 'B' and 'B' can understand 'C', it does not ensure that 'A' can understand 'C'. We can find this sort of problem in an organization. The top-level managers seldom have the opportunity to 'see' the lowest level staff-members. This circumstance leads to little interaction among the stakeholders. Usually, the managers rely on the supervisors' reports to understand the situation of the lowest level staff-members. A supervisor's report is produced by him alone or by incorporating the information provided by the lowest level staff-members. The top-level managers generally assume that they can understand the situation through the report. However, this method does not ensure that the top-level managers understand what the lowest level

taff-members think, because part of the information is lost or distorted in the long hierarchical, node-by-node, information-transmitting channel. Consequently, mutual understanding is not well established and conflicts are provoked. A bureaucratic organization can exemplify this type of situation. In Chapter 4, we will discuss further the consequences of a long hierarchical organization structure.

Induction is definable for class.

Hu (see Yu, Chong Ho web page) writes that induction suggests the possible outcome in relation to events in the long run and it is not definable for an individual event. In a sense, induction is only meaningful for a large class. It is not definable for a single case. For example, we may conclude that the percentage of the population infected with AIDS is

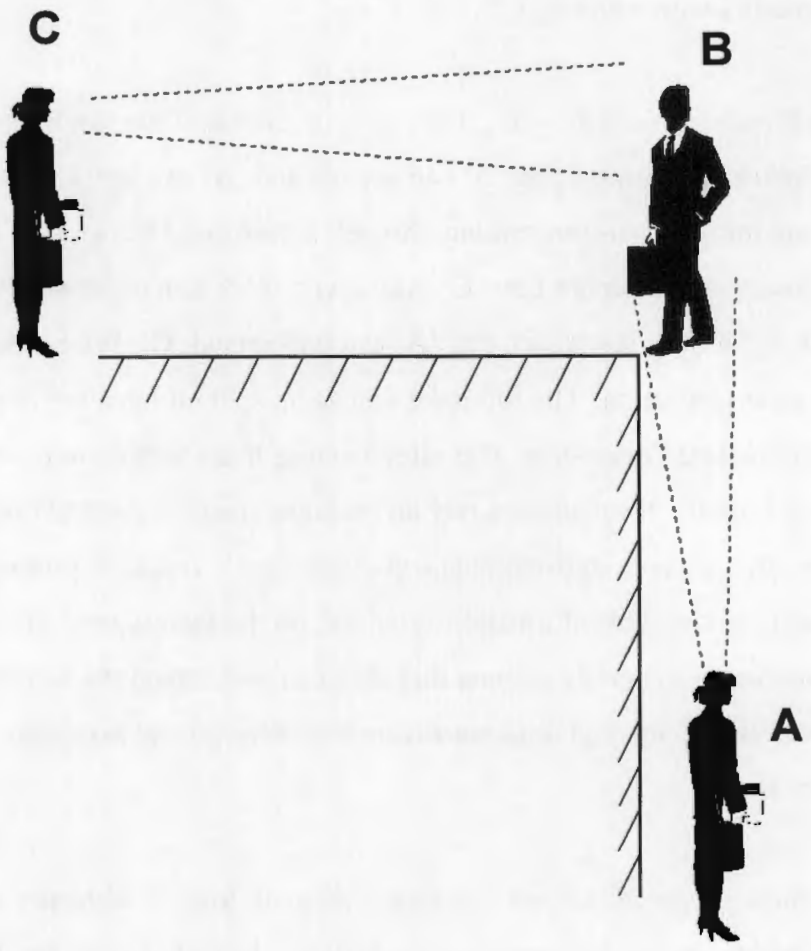


Figure 2-2: Intransitive Situation of 'Seeing'

The boundary line of the above picture represents an obstruction of view, such as a building. The picture shows that although A and B can see each other;
and B and C can see each other;
it does not mean that A and C can necessarily see each other.

0.1%. But it does not make any sense to conclude that an individual is infected with 0.1% AIDS. For an individual is either infected or not infected with AIDS. Similarly, the percentage of marketable ripe oranges can be 70%. But a single orange is either marketable or not marketable, rather than 70% marketable. When we travel on an aeroplane and we are told that the probability of our safe arrival at a destination is 99%, it does not make any sense to us, because we either arrive safely at the destination or we burn into ashes.

The conclusion of empirical reasoning is plausibly true for incessant refinement. Empirical reasoning cannot achieve a conclusive assertion, which is certainly true or exactly true, because the population is inferred by random samples, rather than by examining every element. If we can prolong sampling, the conclusion will be further refined. Hence, the empirical conclusion is supposed to be tentative or plausible, rather than conclusive. Magee (1997, p. 50) explicates Popper's arguments about empirical statements to highlight falsification nature in science. Magee says 'he saw although unrestrictedly general empirical statements prove that a statement of the form "All A's have the characteristics *x*" (e.g., "All swans are white") is true, one single observation of an A that does not have the characteristic of *x* (e.g., a black swan) conclusively proves it to be false. This means that scientific laws, although not verifiable, are falsifiable, *and that means they can be tested.* ... To count as scientific, a theory must be empirically testable, and since the only form of testing that is logically possible is falsification this means the only statements that are empirically falsifiable can have scientific status. Empirical falsifiability, he concluded was the criterion of demarcation between science and non-science'.

As such, a conclusive claim would not be adequate, seen through the lens of fallibilism. Let's borrow an example to illustrate the fallible nature in science. Following is an extract from an e-mail news report forwarded by a colleague. It may illustrate the fallible nature in science:

'A comprehensive study of the origin of mankind has shown that the Chinese have their origin in Africa. This was revealed by a research done by Dr Jane of the University of

Texas in collaboration with other scholars from China. The research was done and it involved almost 28 tribes in China. Reports say that the result of the sample of body cells which were tested had showed that they belonged to *Australopithecus Africanus*, a species which lived in Africa'.

If the reporter of this news argues that the claim is certainly right, we would say it is inadequate. There are approximate 1.3 billion Chinese in this world. How many samples are covered in the 28 tribes? Can we use the samples of 28 tribes to infer the other tribes? Are we sure that all the 1.2 billion Chinese ancestors are from Africa? A conclusive assertion is dubious. In certain cases, it is inadequate to draw a conclusive assertion through the observation of a small number of samples. Secondly, the major premise in the e-mail news item is that Australopithecus Africanus must be the oldest species to have lived in Africa. If the major premise is 'exactly true', our inference is also true. However, in the infinity of time there are always new cases and new pieces of evidence. We do not know whether there are new pieces of evidence that have not been discovered yet. And they might reveal that the oldest 'Australopithecus Africanus' actually lived in Australia, China or the Middle East. When a new piece of evidence is discovered, the original conclusion is completely refuted. As Shaw (1997, p.147) argues, in every case, unless the rival theories are completely ruled out, the evidence does not support a firm conclusion but at best a probable one'.

2.5 The Adequacy Criteria of Knowledge

Following on from the foregoing discussion, we now prepare to put forward the adequate criteria of produced knowledge. The adequate criteria of knowledge serve as the guiding principles to which this research conforms. We summarize that the adequate criteria include the usefulness of knowledge, the refining of knowledge, the process of producing knowledge and the ethic issue on knowledge. The arguments of each criterion are listed below:

The Usefulness of Knowledge

At the outset of this chapter, it was stressed that the objective of inquiring is to acquire

pragmatic knowledge. In a sense, whether the inquired knowledge is adequate or not is dependent on its consequence of application (or testing). In management practice, if the application result of produced knowledge is useful to deal with management problems, we may claim that the knowledge is helpful. 'Useful' knowledge, as was discussed in chapter 2.1, gives one the ability to take action or potential action to do something correctly. On this point, Wicks and Freeman (1998, p. 129) explicate usefulness in terms of pragmatic value system. They argue that the pragmatic criterion of value contains a broad injunction that is adaptable to a wide range of value-systems that may differ substantially from utilitarianism. Instead of offering specific and detailed content to the term, the pragmatic value of usefulness simply requires those engaged in research or decision-making to scrutinize the practical relevance of a set of ideas as defined by their purposes and those shared by their community. In turn, Wicks and Freeman posit two dimensions to represent the criteria of usefulness. They say 'for the pragmatist, the criterion of usefulness applies across two dimensions that the positivist views as sharply distinct: epistemological (is this information credible, well-founded, reliable?) and normative (does this help advance our projects?)'.

In addition to usefulness/advance, expectation is an important element of pragmatism. In other words, we need to consider what conceivable effects of a practice may involve and to prepare ourselves for reactions. Hence, 'advance' and 'expectation' are measurements of the degree to which we acquire the knowledge.

The central purpose of this research is to develop useful knowledge for understanding organization behaviour and for improving its performance. The arguments are progressively developed from Chapters 3 to 7. We postulate that organization contains three inseparable components: organizational structure, organizational process and individual perception. We attempt to explore how the three parts affect organization behaviour. The deductions gradually elicit why pure form of bureaucratic notion is not suitable anymore. However, we are not intending to deny some valuable notions of bureaucracy theory/mechanistic idea, such as discovering invariant elements through analysis. Grounded on the developed concept, we propose a methodology to help us to pinpoint the problems of conventional organization theory, i.e., bureaucratic organization.

The methodology is discussed in Chapter 8. It is applied to one of the biggest cities of South Africa (The City of Tygerberg) to diagnose its organization problems. The application result throws light on the pathological pattern and the sources of problems of the City of Tygerberg. In terms of 'useful', the produced knowledge helps the managers of the City of Tygerberg to take correct actions to resolve problems in order to improve its performance which is a shared purpose of its stakeholders. In terms of 'expectation', the theoretical arguments derived from chapter 3 to 7 are demonstrated by the proposed methodology, which unearths pathological pattern of the City of Tygerberg. Moreover, the proposed methodology enables us to predict the consequence in light of chosen actions.

The refining of Knowledge – Multiplicative Corroboration and Structural Corroboration

The inquiring into complex systems could not exclude experiential learning. Our capacity to explore complex system by relying purely on 'intuition' is very limited. During empirical learning, people's 'agreement' on a reality plays a significant role, which determines whether or not the reality can be accepted. Pepper (1942, p. 47) coins the term 'multiplicative corroboration' to represent 'agreement'. It is a corroboration of man with man. For example, to determine whether a chair can take a man's weight, we may sit on the chair several times. Then, our friends sit on the chair several times. If the chair does not break, we may claim that the chair is strong enough to take a man's weight. The corroboration of truth lies outside the entity.

The other corroboration is termed by Pepper as 'structural corroboration'. Structural corroboration is fact with fact. It is corroboration by evidence. The persuasive force comes from the massiveness of convergent evidences on the same point of fact. It is the structural force of the evidence itself and is not a peculiarly social force. For example, to determine whether a chair is strong enough to take a man's weight, we may consider the kind of wood it is made of, the thickness of the pieces, the nails and the glues employed and so on. Putting all these evidences together, we can justify our belief that the chair is a strong chair. The corroboration of truth lies inside the entity.

The refined knowledge in pragmatism is established on both multiplicative and structural corroboration. The multiplicative corroboration is mostly reflected in the induction phase, which hinges on the number of experiential observations or shared purpose of the relevant stakeholders to put forward claims. The proposed methodology in Chapter 8 to intervene in an organization problem is a corroboration of man with man. The reality is surfaced through a number of people's observation and agreement. The agreement is established in an interactively-based learning activity. The refined knowledge is defensible in the light of the embedded 'logic processor' in the proposed intervention framework. As Checkland (1995, p. 53) points out, the validity of the soft system practice rests on 'relevancy' and 'defensibility'. By 'relevancy, a cyclic learning process is the mechanism to answer whether our activity is relevant in a particular study. By 'defensibility', each phrase in the root definition should lead to particular activities in the model. Each activity in the model should be traceable back to a particular word or concept. The proposed methodology, in turn, is demonstrated in chapter 9 to diagnose the pathological pattern of a bureaucratic organization.

Structural corroboration is mostly reflected in abduction and deduction phase. While a theory is established, the grounds of supporting new ideas could rest on evidences and facts. In this study, the postulation of multiple views to understand organization behaviour is a (see chapter 5) corroboration of a number of fundamental theories. They are manifested in the diversified materials that substantiate the essential characters of organization behaviour. They include functionalistic ideas (Living System Theory, the General System Theory), Ackoff's arguments about purposeful system, ancient oriental thoughts and so forth.

The Process of Producing Knowledge

In chapter 2.2, several lofty inquiring systems are introduced. Owing to the purport of this research is to probe organization phenomena to put forward practical solutions, avoid omitting distinct valuable information, to tackle an issue with shared purpose of relevant stakeholders, and settle down a temporary belief in limited time, the pragmatism inquiring system is chosen as the philosophical foundation of this study. Therefore, this research applies the three stages of pragmatism inquiring system to guide exploration. As

the overview in chapter 2.4, the Peircian MoS comprises three phases: abduction, deduction and induction. Abduction produces exploratory hypotheses. It is about *why* the situation is like this. The adequacy of a hypothesis hinges on testability and its beginning point, i.e., rule. The hypothesis of this research is concerned with understanding organization phenomena. It is established on a testable basis. The consequence of the testing is just the starting point for further actions. In a sense, the diagnostic outcome about the bureaucratic organization provides us with directions for solving the problems.

On the other hand, the beginning point of an adequate hypothesis should be based on acceptable *rules*. In this research, the primary beginning points are Miller's (1978) Living System Theory, the oriental Confucian thought, Ackoff's (1972, 1974 a&b) argument on purposeful system and so forth. These thoughts, perhaps not perfect, are nonetheless acceptable to the community of organization science.

Based on the foregoing thoughts, our speculations on organization phenomena and the problems of conventional organization theory are gradually revealed in Chapters 3, 4, 5 and 6. Chapter 3 points out that 'incorporating' should be an 'ontological element' of metaphorical evolution in organization science. 'Incorporating' means that the new concept should embody the old ideas. Inasmuch as 'incorporating' is essential to metaphorical conception on organization, we claim that organization structure, process and human issue should be taken into account together to deal with organization problems. However, the literature survey of Chapter 4, which is concerned with the 'doubt' about bureaucracy and the proposed approaches to intervene in bureaucracy problems, shows that the proposed solutions are associated with the interest and perception of scholars. Their interests are primarily concerned with organization structure or the human issue. Their interests might lead to the 'root problem' not being identified and the reality not being surfaced. Thus, there is a need to integrate these concepts to co-produce a more holistic picture of the problems of bureaucratic organization.

In Chapter 5, we propose an integrating notion that proposes to understand organization phenomena through multiple lenses. It suggests that the diagnosis of an organization's problem should take several aspects into account. We believe that organization

phenomenon could not be understood through single view. It is an interwoven phenomenon of several characters. These multiple features could impact significantly on organization problems. And provokes a pathological pattern that conceals some intangible elements.

Deduction produces logical inferences based on plausible premises. It is about *how* we reason the implication of our hypothesis. The adequacy of deduction hinges on the premise. If the premise is plausible, the claim is plausible. Moreover, syllogistic reasoning must be established on the transitive contextual relation. The deduction of this research is established on the premises that we put forward in Chapters 3 and 4. It is progressively developed in Chapters 5, 6, and 7.

In Chapter 5, we deduce why organization embodies multiple features. The main reason is that multiple views capture the features of three essential components – organizational structure, organizational process and individual perception. This concept provides a more comprehensive picture to organization study. However, the conventional theory only captures part of the features, such as mechanistic functional structure. It strips off human issue and self-regulating capacity. The deficiencies are probed through two dimensions. From the Confucian perspective we reason why humanity is essential to organization's viability. If the Confucian ideal is deficient in bureaucratic organization, considerable human issue problems could arise. Moreover, if self-regulating capacity is stripped off, the organization does not know how and when to change.

Therefore, this thesis posits that organization should be equipped with a structure like living system. Owning to the conventional theory omitting interdependent concept of organic world, in Chapter 6, based on the Living System Theory and the result of some empirical researches, we reason why information-processing subsystems are the primary sources of problems as far as organization structure is concerned. In addition, we argue that, indeed, structure, process and human issue problems are interrelated. Namely, problem possesses the features of organism. There are interrelated elements in a problem set. Problem is caused by other problems or causing another problem.

But how do problems arise? In Chapter 7, we illustrate that in social organization both problems and complexity arise from human mind. Each person sees problem in different way. Thus, to verify our hypothesis and reasoning, we should integrate the stakeholders' views to diagnose an organization, instead of relying purely on the researcher's observations. But we need a common language for the relevant stakeholders to produce shared view. This necessity leads to seeking an appropriate approach for this study. Chapter 8 devotes to seeking an appropriate language for this study. The proposed language is applied to induction phase.

Induction qualitatively verifies hypotheses. It is about *what* we can acquire from the testing result. The adequacy of induction hinges on adequate empirical measurement. For Peirce, if the sampling is prolonged, the testing result is more valid. However, in addition, a valid empirical measurement, in conventional usage, should meet four criteria – face validity, predictive validity, construct validity and content validity. Face validity is about people's common agreement of the measuring variables. Predictive validity is about the measurement's power to predict the system's behaviour. Construct validity is about the logical relationships among variables. Content validity is about the degree to which a measure covers the range of measuring included within the concept.

Accordingly, in Chapter 8 we suggest an intervention method, which is based on Interactive Management, to attempt to diagnose bureaucratic organization to explore how the structure , process and human issue problems mutually relate. The proposed approach meets face validity, which is reflected in the procedure of Nominal Group Technique. It meets predictive validity, which is reflected in the produced digraph that can show the pathological pattern of an organization. In the pathological pattern we can see how problematical elements mutually interact and display a structure of prediction. The problem structure is consistent with pragmatism's maxim – prediction of consequence. It meets construct validity, which is reflected in the algorithm of the proposed framework. The approach can meet content validity. It depends on the range of stakeholders whom we would like to include in the Interactive Management session.

Chapter 9 is about the application of intervention framework to one of South Africa's

biggest cities – the City of Tygerberg. We divide the participants into three groups – the operation group, the supervisory group and the top-management group. These groups essentially cover the whole range of the bureaucratic organization. However, we concede a snag in the sampling. The snag is that the numbers in the sample are insufficient, owing to the demands of preparation for each IM session. Considerable support is needed, in the form of a facilitator and a computer operator, as well as the group of participants. The time spent on each session depends on the number of interactive activities scheduled for the participants. Usually, each session takes 2~3 days. The conclusion of induction phase is not conclusive. It is tentative. Further study is still needed to progressively refine knowledge.

Figure 2-3 portrays the Peirican inquiring process, which comprises the three stages. The structure of chapters is embedded in the three stages. Through the interweaving of adequate abduction, deduction and induction, we can progressively refine our knowledge, though fallacies are unavoidable in the realm of science.

The Ethic Issue of Knowledge

The view on ethic issue varies from person to person as each one has his/her own philosophical foundation. For Greek philosopher Plato, a person could properly direct his actions only if he knew the transcendent basis of any virtue, and only philosophers who had attained knowledge of that absolute reality would be capable of judging the virtue of any action. For Aristotle, the goal of human life was happiness, the necessary precondition for which was virtue. But the Sophists school argues for situational ethic. Religious belief, political structures, and rules of moral conduct were now seen to be humanly created convention; these were all open to fundamental questioning and change. Man should free himself to pursue a program of enlightened self-interests (see Tarnas, 1996, p.66, 29). Should self-interests be extended to unlimited scope and repel others? This question is explored in the next several passages.

While science flourishes, ethic is injected in different interpretations. For instance, Wicks and Freeman (1998, p. 125) writes 'at its core, positivism assumes the marginality of ethic to organization studies. It posits that the study of organization can occur through a

value-free scientific approach which is qualitatively superior to nonscientific method'. For positivism, obviously, ethic issue is unnecessary. It brings no value to studying social science.

How is the rationalism's view on ethic? Mitroff and Linstone (1993, p. 45) say 'the Analytic Inquiring System places extreme emphasis on logical consistency. Anything or anyone violating the notion of logical consistency, however, it is expressed, is to be ignored or dismissed in the strongest terms'. Mitroff and Linstone's explication on Analytic-Inductive Inquiring System shows that 'logic' is the criterion of 'ethic'.

Opposed to positivism, anti-positivism's view on ethic is very strong. They contend that reality is unequivocal. Science is no more than a subjective web. However, Wicks and Freeman (1998, p. 128) pinpoint the problem of anti-positivists. Anti-positivist researchers continue to be troubled by their inability to fully know their reality and apologize for the 'bias' and 'subjective' of their work rather than rejecting positivist notions of objectivity altogether (and thereby removing the basis of their angst).

In contrast to the polarized beliefs in ethic, Einstein's (1954, p. 14) urge about 'value' tends to be practical. He says 'only the individual can think, and thereby create new values for society, nay, even set up new moral standards to which the life of community conforms. Without creativity personality able to think and judge independently, the upward development of society is as unthinkable as the development of the individual personality without the nourishing soil of the community'. For Einstein, 'creativity' and 'independent thinking' are the vital value of 'knowledge'. In the light of Einstein's urge, positivist versus anti-positivist, functionalist versus anti-functionalist's debate is like a war that disregards the creativities and contributions of the other side.

Does any doctrine privilege over others? The ancient oriental principle – 'A man should not worry that other people do not understand him. He should worry that he fails to understand other people' (see *Confucius Analects*, I/16) - furnishes us wisdom to reconcile the opposing beliefs. The wisdom tells us that ethic intimately relates to 'understanding', 'appreciation' and 'mutual understanding'. We should concern

ourselves to each doctrine's peculiar creativities and contributions even though it has certain limitations. Pragmatism's view on ethic corresponds to such concern. For pragmatism, the vital issue is whether an idea or information is useful to us to cope with the world rather than concerning ourselves to the dispute between different philosophies; i.e., the pragmatism ethic is beyond the debate of polarized doctrines. In this sense, usefulness of knowledge (as the discussion above), shaped by our mutual understanding, is a vital indicator of value and ethic. For instance, Wicks and Freeman (1998, p. 131) emphasize common understanding as a central issue to pragmatism's organization study. They say 'The process of coming to answers should, wherever possible, focus on what people can agree about on these specific issues while trying to avoid bringing in unnecessary philosophical and theological notions. Sharing purposes at the corporation doesn't have to involve sharing the entire worldview and philosophy'. By this 'self-interest' succumbs to 'collective interest'.

Ulrich (see Flood and Jackson, 1991) also puts much emphasis on 'common understanding'. He divides system practice into three levels – operational system management, strategic system management and normative system management. The highest level is normative system management, in which the criterion of good solution is 'ethical'. The basis is building up potential and common understanding. The major trap that we should avoid is unilateral decision-making, where the ideal standard of rationality excludes the affected.

However, this thesis does not intend to divide practice into higher levels and lower levers. Instead, each practice or idea is perceived as fundamental in light of its creative contribution. This idea is manifested in chapter 3 in which the development of organization theory, grounded in metaphor theory, is reviewed. The review reflects 'incorporating' and 'expanding' of concepts are inherent in the development of organization study. In this sense, we need to appreciate the contribution of diversified streams, for example, both functionalism and humanism. Although chapter 4 reflects the doubts about conventional organization theory (bureaucracy theory), it does not mean we should discard every principle of mechanistic age. The orthodox principles still casts light on some characters that organization possess.

Grounded in the arguments of chapter 3 and chapter 4, chapter 5 advocates that we need multiple views (structure, process and individual perception) to understand organization phenomena. The multiple views are interdependent and interwoven. On the one hand, we should appreciate the structural concept established by functionalism. On the other hand, we should value the urge of humanism. Based on this idea, a methodology, based on Interactive Management, is proposed in Chapter 8. It is demonstrated in chapter 9. The central purpose of the proposed methodology is to promote stakeholders' agreement on the collective diagnosis result which is in turn used to verify whether the reasoning about pathological pattern of bureaucratic organization is adequate. A summary of knowledge production of this study, in accordance with the outlined adequate criteria of knowledge, is shown as Table 2-1.

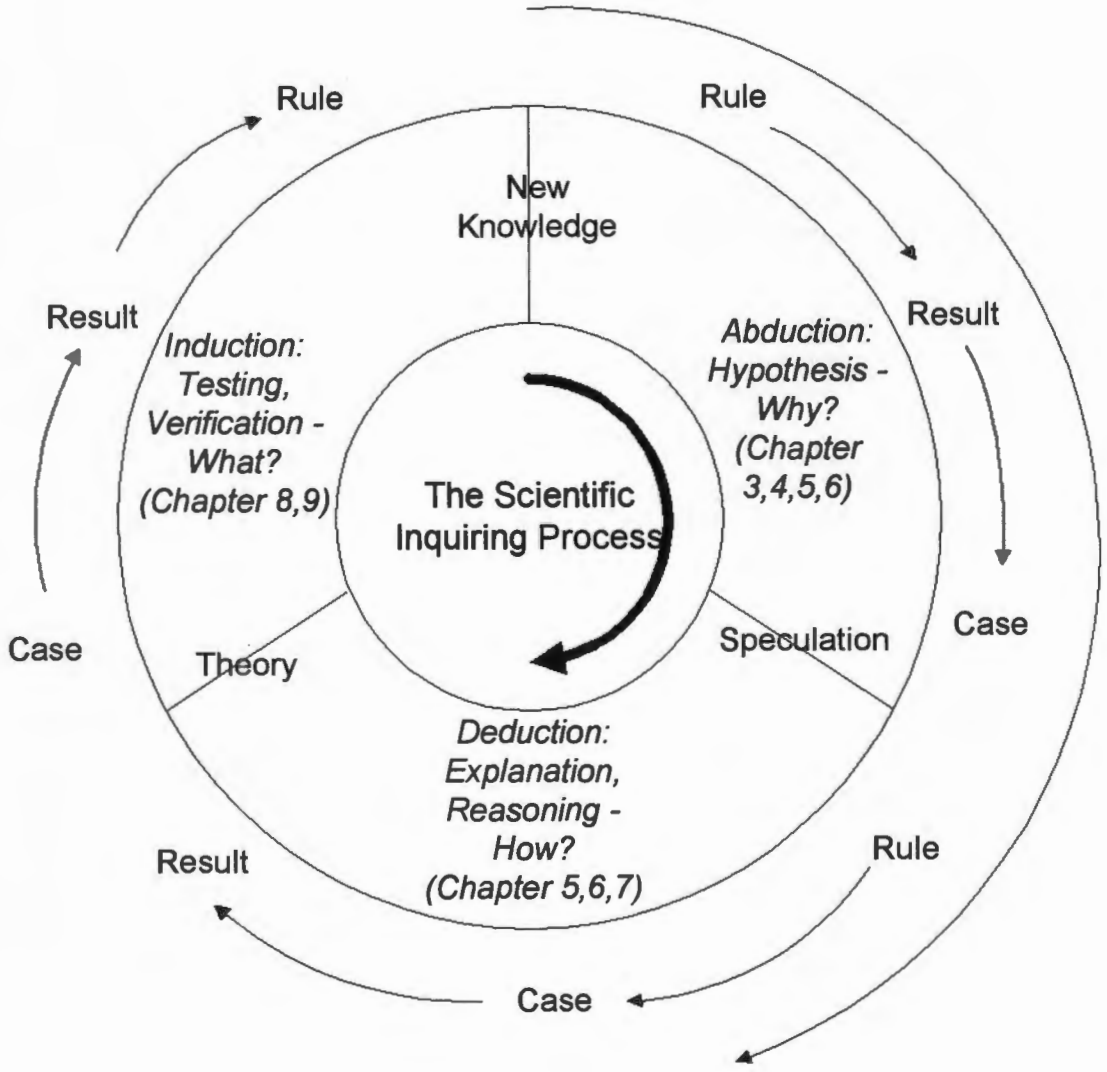


Figure 2-3: The Scientific Inquiring Process

Table 2-1: Summary of Knowledge Production of This Study

Chapter	Produced Knowledge in This Chapter	Usefulness of the Produced Knowledge	Knowledge Production Process
2	Adequate criteria of knowledge.	For evaluating whether the inquiring process and produced knowledge is helpful to resolve management problems	Arguing
3	Exploration of three metaphors which are applied in organization science – mechanism, organism and social system. The exploration reveals that 'incorporating' is an ontological element of metaphor evolution in organization science.	1. For understanding the past experience and the evolution of metaphor theory in organization science. 2. For understanding how the underlying philosophy affects design and diagnosis of organization.	Abduction
4	Review of the critics on bureaucracy and proposed approach to cope with bureaucracy problems. The review indicates that the 'prescription' is dependent on the researcher's interests and may run into the danger of mistreatment.	1. For understanding the weakness of bureaucracy theory. 2. For realizing that the past proposed intervention ideas capture part of the problems. 3. Incentive to develop a reconciling notion to integrate the diversified approach.	Abduction
5	A multiple views to understand organization phenomena.	For furnishing us with a broader picture of organization behaviour.	Abduction Deduction
6	A theory suggests that, in terms of structure, the pathology of bureaucratic organization most likely originates in information processing subsystems. However, when mental pathology is involved, the pathology presents a more complex pattern.	For furnishing us with the likely sources of problems of bureaucracy in terms of its structure , process and people issue.	Abduction Deduction
7	Complexity and problems of organization are in human mind.	For providing the concept that intervention in organization problem should pass through different levels of human perception.	Deduction
8	An interactive intervention framework that can capture broader picture of organization pathology.	1. For providing an approach, which conforms with ethic, as above argued, to unearth organization's complex problem. 2. For promoting stakeholders' agreement on diagnosis result.	Induction
9	A case study shows that the most significant components, which aggravate the problems, lie in the information processing subsystems and the mental pathology is significantly involved.	For demonstrating that the speculation is plausible and the intervention framework is apposite to surfacing different dimension of problems.	Induction

The philosopher of science Thomas Kuhn (1970, p. 92) said: 'Scientific revolutions are non-cumulative developmental episodes in which an older paradigm is replaced in whole or in part by an "incompatible" new one'. Though Kuhn's idea about 'non-cumulative development' is questionable, the idea of an 'incompatible' paradigm is not susceptible to question. At the end of the day we can only prove that our ideas are wrong, rather than that our ideas are correct. Thus, it is inevitable that this research has fallacies and 'incompatible' ideas. Before the ink on this paper is dry, the content is already questionable. However, science is not advanced only by successful fruits. It grows out of many incompatible theories.

Before we illustrate the unsatisfactory opinion (doubt) on conventional organization theory (bureaucracy theory), it is apposite to discuss the firstness of phenomenology in organization science. The firstness in organization science is associated with the metaphor theory, where a number of contemporary prevailing organization concepts germinate. The illustration helps us to understand the relation between the evolution of organizational concept and metaphorical conceptualization. The illustration will progressively lead us to understand that the critics' views of bureaucracy theory are primarily ascribed to its metaphorical foundation, i.e., the mechanism metaphor.

Chapter 3 Conceptualization of Organization through Metaphor Theory

'Using copper as a mirror, we may make our attire tidy.
Using history as a mirror, we may know the rise or fall of a dynasty'.
- Wey Jeng, Tang Dynasty (China), 580-643 AC.

This chapter is concerned with the metaphor theory, which profoundly influences organization design. Metaphor can be seen as a firstness of Peircian phenomenology. It is about seeking analogous things in our experience to understand a puzzling phenomenon. The metaphors that are used to perceive organization are primarily categorized into mechanism, organicism and social system. This chapter illustrates the evolution of metaphor theory in organization science – from mechanism to social system. It will give an overview of mechanism metaphor on which bureaucracy theory is established. Subsequently, we illustrate the emergence of organic metaphor, which includes the Living System Theory, the Viable System Model and the System Dynamic Modeling. Accompanying the emphasis on human rights and freedom, the social system metaphor starts to germinate, that sees the human element in organization, which in turn lends to it the element of purposeful behaviour. In a sense, human is no longer perceived as a part of a machine or a part of a cybernetic organism. Instead, human minds are recognized to have considerable influence on organization behaviour. We conclude that the evolutionary feature of organizational metaphor is 'incorporating'. When the old metaphorical concept is no longer adequate, its idea is expanded and encompassed in the new one. In certain senses, the mechanism should be encompassed in organicism; the organicism should be incorporated in social system. Furthermore, the discussion in this chapter embodies the secondness of organization phenomena; i.e., things relate to the 'feeling' (metaphor), such as the background of the feeling and the further developed organization structure.

The Chinese official, Wey Jeng, who was in charge of admonition and arbitration in the Tang Dynasty, said the above verse. Wey Jeng offered this verse to the king,

Tang-Tay-Tzong, to caution him that he should learn from historical experience to avoid making mistakes which had been made by the kings of the past. For history embodied numerous facts that could help the king to examine whether or not his behaviour was on track to cause either the rise or the fall of the Tang dynasty. There is a simple mapping in this verse. 'History' is conceived as a mirror and 'dynasty' is conceived as attire.

There are two self-introspection questions hinted at in the above metaphorical verse. The first question is how do we know whether our attire is tidy? The second question is how do we know whether our country is 'tidy'? The official, Wey Jeng, conceives the two issues as similar things; i.e., through a mirror we can see whether our dress is tidy; through history we can know whether our country is 'tidy'. History is similar to a mirror that can map historical facts on to our current situation to help us assess whether our behaviour or policy is appropriate. In a sense, through historical experience we can fathom whether a nation will be prosperous or *vice versa*. The verse implies that historical experiences are good references for understanding the present state.

Although the above metaphorical advice concerns how to put a nation on the right track, the application of metaphor is not confined to this field. It has been broadly applied in different domains. In organization science, metaphor has been used as an underlying philosophy where miscellaneous organization theories flourish. The different metaphorical concepts can be understood in terms of the Root Metaphor Theory (Pepper, 1942). A brief overview of the Root Metaphor Theory will be given in a later section. However, prior to the overview of the Root Metaphor Theory, it is necessary to illustrate the meaning of organization. For if no organization exists, no organization theory is needed.

3.1 The Meaning of Organization

Diverse definitions of organization have emerged through the perceptions and interests of different writers. Several examples of these are given below:

(1) Our theoretical model for the understanding of organizations is that of an energic input-output system in which the energic return from the output reactivates the

system (Katz and Kahn, 1966).

(2) Characteristic of organization, whether of a living organism or a society, are notions like those of wholeness, growth, differentiation, hierarchical order, dominance, control, and competition (Bertalanffy, 1968, p. 47).

(3) Organization refers to the complex pattern of communication and relationships in a group of human beings (Simon, 1976, xvii).

(4) A consciously coordinated social unit, composed of two or more people, that functions on a relative continuous basis to achieve a common goal or set of goals (Robbins, 1993, p. 3)

(5) A bounded social unit that is relatively stable and enduring and that contains patterns of social ordering and a distinctive organizational culture (Olsen, 1991, p. 595)

(6) By establishing rule-governed ways of deciding, delegating, and setting the boundaries of membership, a collectivity becomes an organization capable of acting (Argyris and Schön, 1996).

(7) An organization is a system of consciously coordinated activities or forces of two or more persons explicitly created to achieve specific ends (Downs, 1966, p. 24).

The foregoing definitions of organization emanate from both Biology and Social Science. The shared factors of the above are 'persons', 'interactions' and 'goals'. In a sense, organization consists of at least two persons; a single person formed unit is not considered as an organization, because there is no interaction in the unit. Hence, family can be considered as the smallest organization in a society. Interaction implies the governed ways of pursuing common goals. The governed ways may include the flow of information, the means of coordination, the constitution that articulates the role of each member and so forth. If there is no interaction, the collectivity has no communication, no role, no information flow, no decisions to be made, and even no competition, as in Bertallanffy's concept of organization. Ultimately, the social unit formed by people is for pursuing a common goal. If it has no goal, then it is like duckweed drifting on water. It makes no difference where it goes. The common goals serve both organization and the collective interests of members. Cumulatively, in this research, organization refers to social organization, populated by people, rather than organized objects. This research uses the following definition: *an organization is a minimum of two persons where each*

person has his specific pattern of roles and interactions with the others designed to achieve goals, using available resources, shaped by underlying purpose. The minimum of two persons implies multiple human participation. The specific pattern of roles indicates that a single person cannot carry out the work and a structure is needed to identify each person's role. Interaction means that the elements interact to 'produce' the organization's goals. Hence, people are the most fundamental part of organization. Without people, organization has no purpose, no behaviour and no shaped goal at all. 'Available resources' means the resources that can contribute to achieve underlying purposes, such as building, facility, money and so forth.

The goals are adaptive or inflexible, depending on how people perceive an organization. For example, the mechanistic organization's goals are as independent variables, whereas, in some way, the systemic organization's goals are as dependent variables (such as Ackoff, 1994 - social system theory). The reasons that the two streams perceive goals in different ways stem from the different underlying philosophies. This difference can be understood in terms of the Root Metaphor Theory (Pepper, 1942).

3.2 The Root Metaphor Theory

Pepper (1942) proposes four world hypotheses, which construct the bases of our knowledge about the world. He describes his concept of a world hypothesis as follows:

> The suggestion is that world hypothesis get started like any man's everyday hypothesis framed to solve some puzzling practical problems. The man looks back at his past experience for some analogous situation, which might be applicable to the present problem. Similarly, a philosopher, puzzled about the nature of the universe, looks around for some pregnant experience that appears to be a good sample of the nature thing. This is his root metaphor. He analyses his sample, selects its structural elements, and generalizes them as guiding concept for a world hypothesis of unlimited scope. This set of concepts becomes the set of his categories of his world hypothesis. (Pepper, 1973)

The above delineation shows that the core of world hypotheses is root metaphor, which

emanates from our experience. It gives the initiative and fundamental idea for a scientist to explain puzzling phenomena. The proposed four world hypotheses are:

(1) formism;
(2) mechanism;
(3) contextualism; and
(4) organicism.

For formism, the root metaphor is our everyday perception of *similarity* in the world around us. The formist sees things as similar because they have been developed based on some ideal form. All objects in the world fit into a number of forms, which gives rise to an object's quality. Nominal scale, such as categorization, is a good example to demonstrate the concept of formism. For example, a red apple possesses the form of roundness, fruit, red and so forth. Truth in formism consists in a similarity or correspondence between two or more things where one thing is said to be true of the others. For instance, for a formist, Newton's Law of Motion (F=ma) can be used to exemplify the motion of substance, although the law is valid only in an ideal condition; i.e., disregarding friction force.

For contextualism, the root metaphor is the *historic event*. Contextualism sees the world as in continuous flux, and focuses on 'changing present event'. The above-quoted Chinese official's verse can be used to illustrate this world hypothesis; i.e., historic events can be applied to understand present phenomena. A brief overview of contextualism philosophy has been given in Chapter 2, 'The Piercian Epistemology'. Peirce is seen by Pepper to be one of the exponents of contextualism.

The world hypotheses of mechanism and organicism have provided the bases of two influential organization philosophies that have dominated organization and management since the Industrial Revolution. The root metaphor of mechanism is the *machine*. From the mechanism point of view, world phenomena are mechanistic and are constructed from interconnected parts into a hierarchical form. As Kolb (1984, p. 114) says: '... the knowledge in mechanism is refined by analyzing the world as if it were a machine'. In a sense, in the mechanistic organization humans are regarded as part of a machine to

perform regular and routine tasks. This notion is epitomized by bureaucracy theory.

On the other hand, Ackoff (1981) interprets mechanism as the concept that the universe derives from the exclusive use of *analysis* and the doctrines of *reductionism* and *determinism*. Analysis is the doctrine that tries to understand the whole by taking apart the whole and understanding the behaviour of the parts. The assembly of the understanding of the parts amounts to the whole. Given the commitment to analysis, the belief that all reality and our experience of it can be ultimately reduced to indivisible elements is reductionism. Determinism is the doctrine that everything has to be taken as the effect of some cause. Ackoff's interpretation shows that linear hierarchical breaking-down analysis, cause-effect principle and the concept of 'materialist monad' dominates the thinking of the mechanistic age.

In contrast to the mechanistic view, the root metaphor of organicism is an *organism*, which explains world phenomena in terms of organic process within an organic structure. Every part is related, directly or indirectly, to the other parts of a containing whole. Pepper (1942, p. 300) points out:

> On the basis of either of these statements, we may note degree of organicity or degree of approach to complete organicity. Some parts of the system may be highly implicative and others less so. An alteration of an element of a system may have serious effects on some parts of the system and negligible effects on others. But so long as a system does hold together with some degree of implicativeness in its element, or so long as the parts of the system are seen to have some effects on other parts, it is in that degree of organic.

The above explanation reveals an essential feature of organicism, i.e. 'interrelationships'. Different schools of systems thinkers further elaborate the concept of organicism and apply the knowledge to organization. The elaboration symbolizes the emergence of systemic organization. Although the developed concepts are somewhat eclectic and overlapping, they can be reflected in the notions of 'cybernetic', 'learning' and 'humanity'. 'Cybernetics' is defined by Weiner (1961, p. 11) as 'the entire field of control

and communication theory, whether in the machine or in the animal'. Its objective is to study the mutual influence and feedback of system elements for directing system variables toward desirable homeostasis. 'Learning' stresses the concept of double-loop learning instead of single-loop learning. Anderson (see Anderson's web page) articulates Argyris's idea of double-loop learning to discern it from the conventional single-loop learning which focuses on action strategy, rather than governing variables. The learning here means double-loop learning. It is about adaptation behaviour that challenges the governing variables of a system, such as value and norm. 'Humanity' connotes that people are a purposeful system. Its proposition is to take people's minds into account during the design of a system. The above postulations can be epitomized by the following schools: System Dynamic Modeling (Forrester, 1961), Viable System Model (Beer, 1979,1981), Living System Theory (Miller, 1978), Learning Organization (Senge, 1990), Social System (Ackoff, 1994) and so forth.

The foregoing diversified views on organization are grounded in different metaphor foundations. They profoundly affect our approach to intervening in organization problems. Comprehension of their ideas may help us to explore the essential features of organization. The next section illustrates the diversified school's ideas and their contributions to organization design.

3.3 Conceptualization of Organization

Morgan (1986) summarizes eight types of images of organization. They are:

(1) Organization as machines;
(2) Organization as organisms;
(3) Organization as brains;
(4) Organization as cultures;
(5) Organization as political systems;
(6) Organization as psychic prisons;
(7) Organization as flux and transformation;
(8) Organization as instruments of domination.

'Organization as machines' is grounded in Pepper's arguments about mechanism metaphor. 'Organization as flux and transformation', 'organization as organism' and 'organization as brains' are primarily grounded in the organicism metaphor. In contrast, the propositions of 'organization as cultures', 'political systems', 'domination instrument' and 'psychic prisons' correspond to the social system metaphor (see Ackoff, 1994). An overview of these notions is given below:

3.3.1 The Machine Metaphor – Bureaucracy Theory

The machine metaphor can be epitomized by bureaucracy theory of which the founder is Max Weber. Weber (1948) depicts its features as follows:

(1) There is the principle of fixed and official executive areas, which are generally ordered by rules, laws or administrative regulations;
(2) The principle of office hierarchy and the levels of graded authority mean a firmly ordered system of super- and sub-ordination, in which there is a supervision of the lower offices by the higher one;
(3) The management of the office is based on written documents, which are preserved in their original or in draught form;
(4) Office management, at least all specialized and distinctly modern office management, usually presupposes thorough and expert training;
(5) When the office is fully developed, official activity demands the full working capacity of the official, irrespective of the fact that his required time in the bureau may be firmly delimited;
(6) The management of the office follows general rules, which are more or less stable, more or less comprehensive, and which can be learned.

Weber's delineation on bureaucracy shows that 'impersonal relationship', 'standard operation procedure' and 'hierarchical structure' are the core concepts of bureaucratic organization. 'Impersonal relationship' connotes that intimate friendship is not the way to get work done. Rather, work is accomplished through 'standard operation procedure', which is firmly grounded in 'rules and regulations'. The 'hierarchical structure' portrays how information flows in an organization. The superiors are supposed to have better

knowledge to make decisions. Thus they give instructions to the lower level subordinates. Besides, the subordinates can only receive instructions and communicate with the next level superiors. Figure 3-1 shows how formal information flows in a bureaucratic structure. In Figure 3-1, when operational $staff_{111}$ needs operational $staff_{333}$'s help, his request must go through $supervisor_{11}$, top-level $manager_1$, executive, top-level $manager_3$ and $supervisor_{32}$. The information has to pass 5 nodes to reach operational $staff_{333}$. This form of information transmitting manifests a long communication channel. A top-down or bottom-up communication channel is the way to convey a message. Cross communication is not permitted among the departments; i.e., informal communications are normally seen as absurd activities.

On the other hand, the bureaucratic organization structure highlights a centralized decision-making process. Policy and decision are made by a few people rather than by internalizing the majority's ideas. Besides, the empowerment of each member is very limited. When a department intends to resolve a problem that needs joint activities, usually the chief executive has to coordinate the departments to get the work done. The bureaucratic structure shows centralized power. The real power is in the machine owner's hand. The machine owner's goal is the goal of the organization. The owner's mind is the spirit of the machine. The remaining parts of the organization, including staff-members and infrastructures, are viewed as purposeless parts of the machine to serve the owner's will and strive to achieve his goal. The parts of the machine have no choice in response to a situation. Hence, mechanistic organization can be viewed as a goal-achieving device. Its goal is an independent variable.

The mechanism concept is also manifested in F. W. Taylor's scientific management. Sheldrake (1996, p. 15) articulates Taylor's management concept as breaking each job down into simple, basic elements and, with the co-operation of the workers, timing and recording them. Timings of the basic elements are then placed on file and, with appropriate weightings built in, used as the means to construct standard times for various jobs. This concept shows that each job contains a number of 'materialist monads' that are mutually independent. It manifests the materialist's worldview that reality is ultimately constituted of independent and indivisible elements. The aggregation of the analyzed

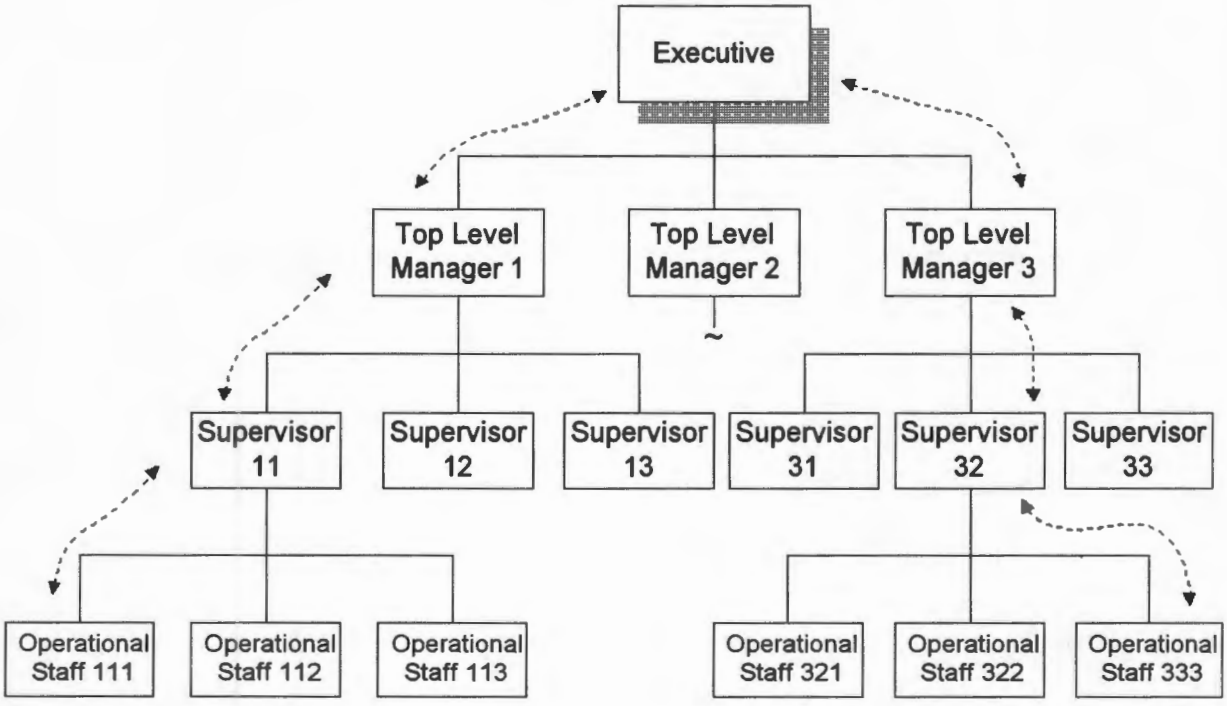


Figure 3-1: Formal Information Flow in a Bureaucratic Organization

elements amounts to the whole. Obviously, Taylor's concept of scientific management is underpinned by analysis, reductionism and determinism.

Frank Bunker Gilbreth's work on motion study is also rooted in the mechanism concept. Gilbreth proposes 6 steps of motion study (see Sheldrake, 1996, p. 29):

(1) 'Reduce' present practice to writing.
(2) Enumerate motion used.
(3) Enumerate variables which affect each motion.
(4) 'Reduce' best practice to writing.
(5) Enumerate motions used.
(6) Enumerate variables which affect each motion.

The 6 steps of motion study manifest the imprint of 'mechanistic standardization' and 'reduction'. The identified variables help to 'analyze' the motions involved in any particular operation.

The mechanistic approach has its strength in certain conditions. Morgan (1986, p. 34) points out several strengths as follows:

(1) when there is a straightforward task to perform;
(2) when the environment is stable enough to ensure that the products produced will be appropriate ones;
(3) when one wishes to produce exactly the same product time again;
(4) when precision is at premium;
(5) when the human 'machine' parts are compliant and behave as they have been designed to do.

The above strengths reveal that 'routine task' and 'stable environment' are suitable conditions in the germinating of mechanistic concept. These conditions are similar to the environment of the Industrial Revolution.

Olsen (1991, p. 356) further points out the advantages of bureaucracy: 'equity', 'accountability' and 'stability'. 'Equity' implies that the treatment of individuals is fair and just and that there is no discrimination against any categories of people. This advantage is mainly contributed by 'impersonal relationship'. 'Accountability' means that responsibility for every activity and decision is assigned to a specific position or office because each position has a specific function for undertaking a specific task. It implies that there is no collective responsibility. Thus, each problem is assigned to an appropriate office to deal with. Therefore, the office is accountable for resolving the allocated problem; no other office is responsible for the outcome. 'Stability' concerns an organization's capacity to cope with external threats and internal strains to maintain its existence and cohesion. This merit is mainly attributed to centralized control procedure. The centralized control prevents the members from taking actions that deviate from the organization goal. The military command-control is a typical example of this advantage.

The mechanistic approach has dominated organization design since the Industrial Revolution. The stable conditions and invariant tasks entail successful 'hierarchical control' and 'impersonal relation'. The established rules and regulations are not susceptible to the stable environment. The mechanistic organization works very well when the circumstances are invariant. However, our environment is becoming more and more complex and dynamic. The conventional theory is becoming vulnerable to the unstable environment. This tendency entails the germinating of organic ideas.

3.3.2 The Organism Metaphor

The organism metaphor conceives organization as an open system, which ingests material; processes it; extrudes products. The output may reactivate the system. The system's parts are interrelated. Change of one element may cause direct or indirect influence on the other elements. Additionally, the system can undertake self-regulating to adapt to environment change. In other words, unlike a machine, organic system is equipped with better competence to cope with an unstable environment. Grounded in requisite subsystems and complicated communication and control, an organic organization has a feedback structure to modify its actions to seek the goal.

The system thinkers strive to explore the essential subsystems for an organic organization so that it is viable and adaptive. Katz and Kahn (1966) propose five essential subsystems, which exist in social organization, for maintaining its survival. The five essential subsystems are:

(1) the *production* subsystems, concerned with the work that gets done;
(2) *supportive* subsystems of procurement, disposal, and institutional relation;
(3) *maintenance* subsystems, for tying people into their functional role;
(4) *adaptive* subsystems, concerned with organizational change;
(5) *managerial* subsystems, for the direction, adjudication and control of the many subsystems and activities of the structure.

Katz and Kahn's proposition shows that the supportive subsystems are in charge of input and output. The production subsystems are the throughput, which process the intake of material. The maintenance subsystems provide a communication channel for sustaining a cohesive organization. The adaptive subsystem is concerned with self-regulating and goal-seeking. It focuses on regulating organization to cope with environment change. The managerial subsystem makes decisions, based on the information provided by the other four subsystems, for achieving organization objectives and maintaining the organization's survival. The first three subsystems are about organization efficiency[2], while the other two subsystems, adaptive and managerial, are about organization effectiveness[3]. These subsystems are further developed in LST and VSM.

3.3.2.1 Living Systems Theory (LST)

Miller (1978) further elaborates the organism metaphor and contends that 19 critical subsystems exist within living systems; and there are seven levels of living systems in the world. The seven levels of living systems are cell, organ, organism, group, organization, society and supranational systems respectively. Miller (1980, p. 65) argues that the world starts evolution from cells towards more complicated supranational systems. Each higher

[2] Efficiency comprises achieving existing objectives with acceptable use of resources (Carnall, 1995, p. 76).

[3] Effectiveness means efficiency plus adaptability (Carnall, 1995, p. 76).

level of living system evolves by the shred-out process from the next lower level of living system. The shred-out process is shown as Figure 3-2. It reveals the isomorphic mapping of the seven levels of living systems. The isomorphic mapping implies that the relations of a higher level of living systems have more formal identities than a lower level of living systems. For Miller, the mapping is not merely between organization and organisms, but extended to society and supranational systems.

The 19 critical subsystems are the subsystems that process matter-energy, information or both of them. A subsystem that processes both matter-energy and information is reproducer and boundary. A subsystem that processes matter-energy is ingestor, distributor, converter, producer, matter-energy storage, extruder, mortor and supporter. A subsystem that processes information is input transducer, internal transducer, channel and net, decoder, associator, memory, decider, decoder and output transducer. The functions of the critical subsystems are shown in Table 3-1, which provides the general description of the 19 critical subsystems. However, the interpretation of each critical subsystem varies from level to level. For example, internal transducers at organism level are 'postsynaptic regions of neurons with which afferent neurons from organs synapse; receptor cells within the central nervous system that receive and transduce signals about chemical and physical states of the bloodstream'. At organization level, it is 'such subsidiary organizations or groups that make reports within an organization or ascertain needs, attitudes, or efficiency of components and subcomponents; are spokesmen for components, like committee chairmen, department heads, union stewards and other officials, public opinion pollers, inspectors, bookkeepers, the comptroller's office, the payroll department, accountants; operation analysts; citizens' groups or organization' and so forth. At society level, it is 'such organizations as representative legislature, political party, board of election, survey or public opinion polling organization, secret police, governmental statistical organization; advertising and public relations business, social change organization, ethnic organization, labour union,, legislative lobby, chamber of commerce, church, service organization, news medium; bank or financial institution and so forth'. Although each subsystem is given a specific interpretation at each level, there remain general cross-level features. As the example reveals, the main function of internal transducer is to 'receive information from subsystems and change it to transmittable

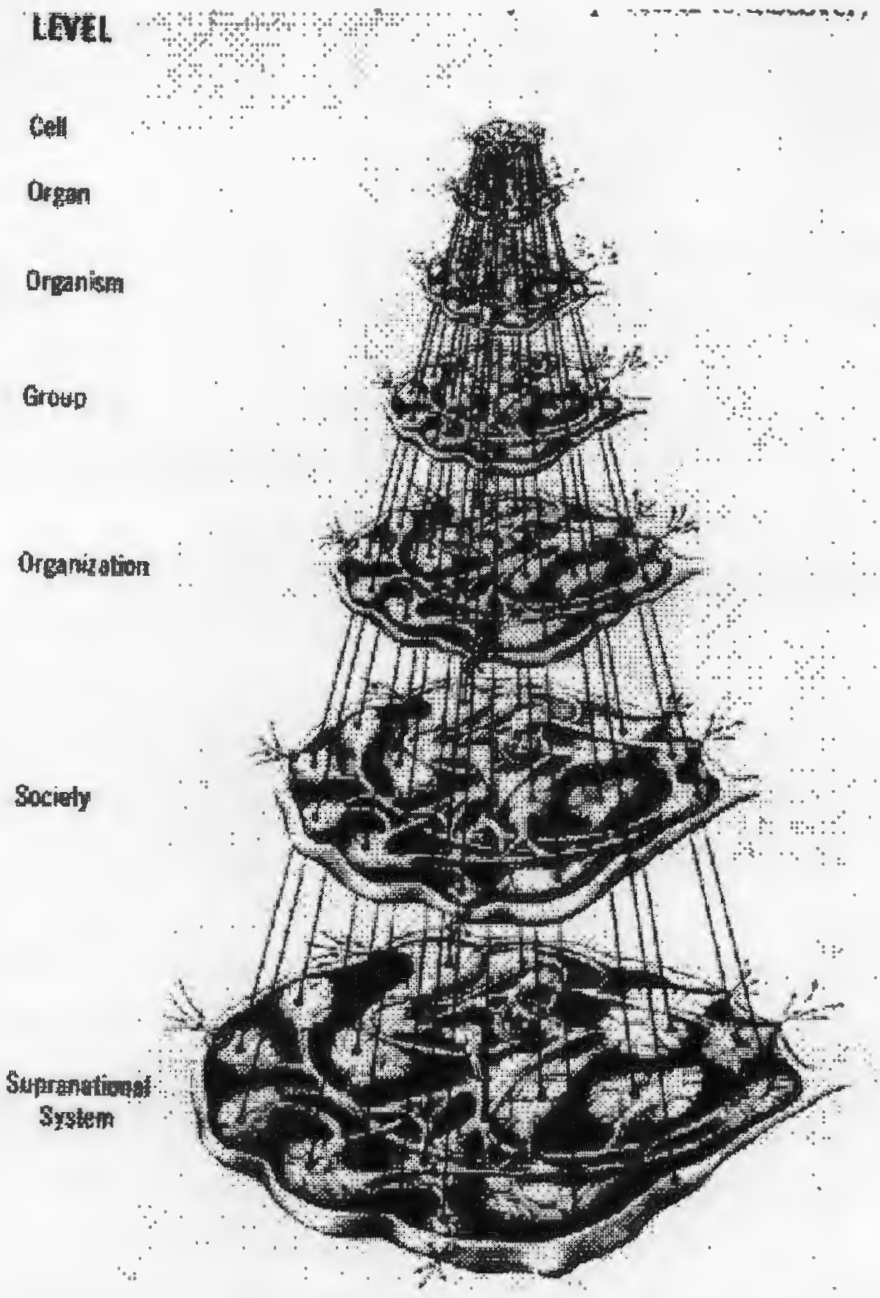


Figure 3-2: Shred-out. The generalized living system is shown at each level. (Source: Miller, 1978)

Table 3-1: The 19 critical subsystems of living systems (Source: Miller, 1978)

Subsystem Which Process Both Matter-Energy and Information	
REPRODUCER (RE) –the subsystem which is capable of giving rise to other systems similar to the one it is in.	
BOUNDARY (BO) –the subsystem at the perimeter of a system that holds together the components which make up the system, protects them from environmental stresses, and excludes or permits entry to various sorts of matter-energy and information.	
Subsystems which process matter-energy	Subsystems which process information
INGESTOR (IN) – the subsystem brings matter-energy	**INPUT TRANSDUCER (IP)** – the sensory subsystem which brings markers bearing information into the system changing them to other matter-energy forms suitable for transmission within it. **INTERNAL TRANSDUCER (IT)** – the sensory subsystem which receives, from subsystems or components within the system, markers bearing information about significant alterations in those subsystems or components, changing them to other matter-energy forms of a sort which can be transmitted within it.
DISTRIBUTOR (DI) – the subsystem which carries inputs from outside the system or outputs from its subsystems around the system to each component.	**CHANNEL AND NET (CN)** – the subsystem composed of a single route in physical space, or multiple interconnected routes, by which markers bearing information are transmitted to all parts of the system.
CONVERTER (CO) – the subsystem which changes certain inputs to the system into forms more useful for the special processes of that particular system.	**DECODER (DE)** –the subsystem which alters the code of information input to it through the input transducer or internal transducer into a "private" code that can be used internally by the system.
PRODUCER (PR) – the subsystem which forms stable associations that endure for significant periods among matter-energy inputs to the system or outputs from its converter, the materials synthesized being for growth, damage repair, or replacement of components of the system, or for providing energy for moving or constituting the system's outputs of products or information markers to its suprasystem.	**ASSOCIATOR (AS)** – the subsystem which carries out the first stage of the learning process, forming enduring associations among items of information in the system.
MATTER-ENERGY STORAGE (MS) – the subsystem which retains in the system, for different periods of time, deposits of various sorts of matter-energy.	**MEMORY (ME)** – the subsystem which carries out the second stage of the learning process, storing various sorts of information in the system for different periods of time. **DECIDER (DC)** – the executive subsystem which receives information inputs from all other subsystems and transmits to them information outputs that control the entire system. **ENCODER (EN)** – the subsystem which alters the code of information input to it from all other information processing subsystems, from a "private" code into a code which can be interpreted by other systems in its environment.
EXTRUDER (EX) – the subsystem which transmits matter-energy out of the system in the forms of products or wastes.	**OUTPUT TRANSDUCER (OT)** – the subsystem which puts out markers bearing information from the system, changing markers within the system into other matter-energy forms which can be transmitted over channels in the system's environment.
MOTOR (MO) – the subsystem which moves the system or parts of it in relation to part of all of its environment or moves components of its environment on relation to each other.	
SUPPORTER (SU) – the subsystem which maintains the proper spatial relationships among components of the system, so that they can interact without weighting each other down or crowding each other.	

form'. In organism, this role is played by postsynaptic regions of neurons. In organization, its role is played by human beings. In society, this function is performed by organizations.

An information-processing subsystem is not shown in Table 3-1. It is *timer*, which was identified recently. The function of *timer* is to transmit to the decider information about time-related states of the environment or of a component of the system. This information signals the decider of the system or decider of subsystems to start, stop, alter the rate, or advance or delay the phase of one or more of the system's processes, thus coordinating them in time. At organization level, *timer* can be exemplified by the people who operate the factory whistle.

Figure 3-2 shows that the 19 critical subsystems are interwoven and linked. The configuration of connections depends on what kind of living system it is. No conclusive cross-level identifications can be made about how the subsystems mutually connect, because each level of a living system has its own unique ways of processing matter-energy and information. Clark (see Clark's web page) draws an affinity diagram, which shows the link between subsystems. However, Clark emphasizes that the connections between subsystems are illustrated. They are not descriptive. It should be taken as a suggestion for a probable related subsystem. Tracy (1989) also tries to draw a diagram that shows relationships among critical subsystems. But Tracy emphasizes that the picture is a simplified picture. Although there are no conclusive connections between the critical subsystems, we need to notice that the subsystems are interrelated. Thus change of one subsystem may have a direct or indirect influence on the other subsystems.

In addition to the proposed general features of the 19 critical subsystems, LST sheds light on the meaning of structure and process of each critical subsystem. For Miller, system structure is the arrangement of its subsystems and components in three-dimensional space at a given moment of time; process refers to all change over time of matter-energy or information in a system. The definition of structure concerns how the system components are structured to perform their functions. In contrast, process concerns how things are changed in the structure. In addition, the definition of process reveals the characteristics of 'living'; i.e., if the process ceases, then the system is dead. It implies static equilibrium

or maximum entropy.

Other important aspects of LST are the cross-level hypotheses. They relate to the general structure and process within each critical subsystem, and to the general relations among critical subsystems. The hypotheses are divided into high, medium and low 'probable true'. For example, one hypothesis concerning a channel and net subsystem is that 'in a channel there is always a progressive degradation of information and decrease in negative entropy or increase in noise. The output information per unit time is always less than it was at the input'. The truth of this hypothesis is highly probable and it is explained by the Second Law of Thermodynamics: i.e., all substances tend to reach maximum entropy, which is the most probable state. It sketches the information declining or lost in a long transmitting channel. At organization level, this phenomenon often occurs in a deep hierarchical structure. (As the previous chapter mentions, 'hearing' is not a transitive relation. After successive transmitting of a piece of information, the original meaning is often distorted.)

Miller conducts extensive research on the hypotheses that are relevant to information input overload. The research results reveal that living systems have the capability to undertake an adjustment process to cope with input information overload. However, after the information input has reached a certain level, the living systems will be overwhelmed and considerably reduce the information output rate. However, the findings reveal that a lower level living system has a better capability to cope with information input overload than a higher level living system.

LST has made a great contribution to understanding the behaviour of higher level living systems through the features of lower level living systems. The shred-out process presents the structural similarities of living systems, in which energy and information are processed. In brief, the organic metaphor underpins the development of LST where the cross-level hypotheses are tested.

3.3.2.2 Viable System Model (VSM)

In contrast to LST, Beer's viable system model (Beer, 1981) is more concerned with

communication and control within an organization. VSM is grounded in the concept of neurophysiology, which explores how an organism controls its organs and limbs for maintaining viable independence. The management system of an organization, through the lens of neurophysiology, is conceived as a brain. VSM proposes five systems to maintain the viability of an organization. The five systems are:

(1) System 1, which consists of the operational systems. These realize the value that makes the organization relevant in its environment;
(2) System 2, which consists of those activities that ensure the co-ordination and coherence between its operations.
(3) System 3, which resources and regulates the overall performance of its operations;
(4) System 4, which develops the intelligence needed to ensure the continuing relevance of what the operations produce;
(5) System 5, which formulates the policies for developing the capability of the organization and matching it with the changing threats and opportunities in its environment.

The five systems are interconnected by a complicated control loop. System 1 comprises several subdivisions to produce the products, which are delivered to the environment. The subdivisions could be mutually dependent; i.e., they could rely on the other subdivisions to supply the materials that are used for their production. When the process is as perfectly operated as the plan, the subdivisions will have no problems. But if the performance of one of the subdivisions deviates from the plan, the progress of the others could be impeded if no 'in time' alarming is received. Hence, system 2 deals with such problems and regulates the process to prevent oscillation occurring. The abnormal situation in system 1 is automatically transmitted to system 2 and dispersed to other operational subdivisions so that they can make a plan to keep the operation within the normal condition, e.g., to purchase the material from outside suppliers. However, system 2 can only handle the routine control, which is concerned with internal environments. We should realize that system 1 interacts with external environments, which contain great varieties that system 2 could not handle. Therefore, system 3, the highest level of autonomic management and the lowest level of corporate management, receives

information from both system 2 and system 4 (which interacts with external environments, deals with adaptation and maintains the homeostasis of operational systems). System 3 also directly connects to system 1 to handle non-routine control. This loop is similar to a parasympathetic nerve, in contrast to the sympathetic nerve, the role of which is played by system 2. System 4 interacts with external environments and continuously acquires update intelligence to make plans for the adaptation of the organization. The update intelligence is transmitted through system 4 to system 5, together with system 4's plan. System 5 formulates policies and monitors homeostasis between system 3 and system 4. The structure of system 5 is similar to the brain's cortex. Unlike the conventional hierarchical structure, the multinode structure of system 5 ensures higher reliability on policy formulation because the elements are interactively assembled.

A remarkable notion of VSM is about recursion, which is similar to a Chinese box or a Russian doll; i.e., each viable system is embedded in the next higher level viable system or it has the next lower level viable system embedded within it. The recursive embedding shows that different levels of viable systems are interconnected. However, system 1 is always a viable system in itself. This implies that recursion starts from system 1 of the highest level viable system. The recursive design ensures that each operational subsidiary can be independently viable.

In summary, VSM is grounded in the metaphor of an organism's brain. It breaks through the conventional organic concept and suggests a clearer picture of communication and control. Throughout the rigorous design, the 5 important systems are developed and interconnected in a way similar to a human's neurophysiology system. The interaction of the 5 systems can generate greater varieties to cope with the proliferating varieties or complex circumstances so that an organization is able to be independently viable.

3.3.2.3 The Similarities between LST and VSM

There are several similar features in LST and VSM. First, Miller's notion about the shred-out process implicitly corresponds with Beer's proposition on the nature of a scientific model (Beer, 1966, 1984), which is used by Beer to develop VSM. Beer

contends that a scientific model is started by metaphorical similarities between a managerial situation and a scientific situation. The first step is to present both situations by means of conceptual models. If an analogy exists between them, a rigorous formulation is further developed to examine whether identities exist between them. The rigorous formulation is called 'many-one homomorphic transformation', which implies simplification, because we could not deal practically with all the details of a scientific problem. Hence, we attempt to simplify a complex system by transforming several states of a system into one state, while preserving the operational characteristics. Additionally, the unimportant or irrelevant variables are excluded from consideration. After the rigorous models have been formulated through homomorphic transformation, we examine whether formal identities exist between the two. If they exist, we can then generalize a scientific model that is valid in both situations.

On the other hand, the purpose of LST is to put into prose a conceptual system concerning variables – units and relationships – which have important formal identities (or isomorphism) with concrete living systems (see Miller, 1978). This implies that the purpose of LST is to develop models that preserve the relationship features from a lower level of living system to a higher level of living system. (Miller reserves the word 'model' for a formal identity between a conceptual system and a concrete [or an abstracted] system). A further purpose is to understand the more complicated phenomena in higher level systems, such as organization and society, through our knowledge of the fundamental systems, such as cell and organism. The homomorphic transformation is reflected in the variables of the 19 critical subsystems. The isomorphic one-to-one mapping is reflected in the shred-out process.

Figure 3-3 portrays the similar model development of LST and VSM. We can see that both Beer's and Miller's ideas originate from organic metaphor. They develop the models through a consistent procedure, i.e., by using homomorphism, extracting and isomorphism mapping. The organic worldview is embraced in both LST and VSM

In addition, they possess similar features as regards the structural aspect. Rasegard (1991) summarizes the similarities between them as follows:

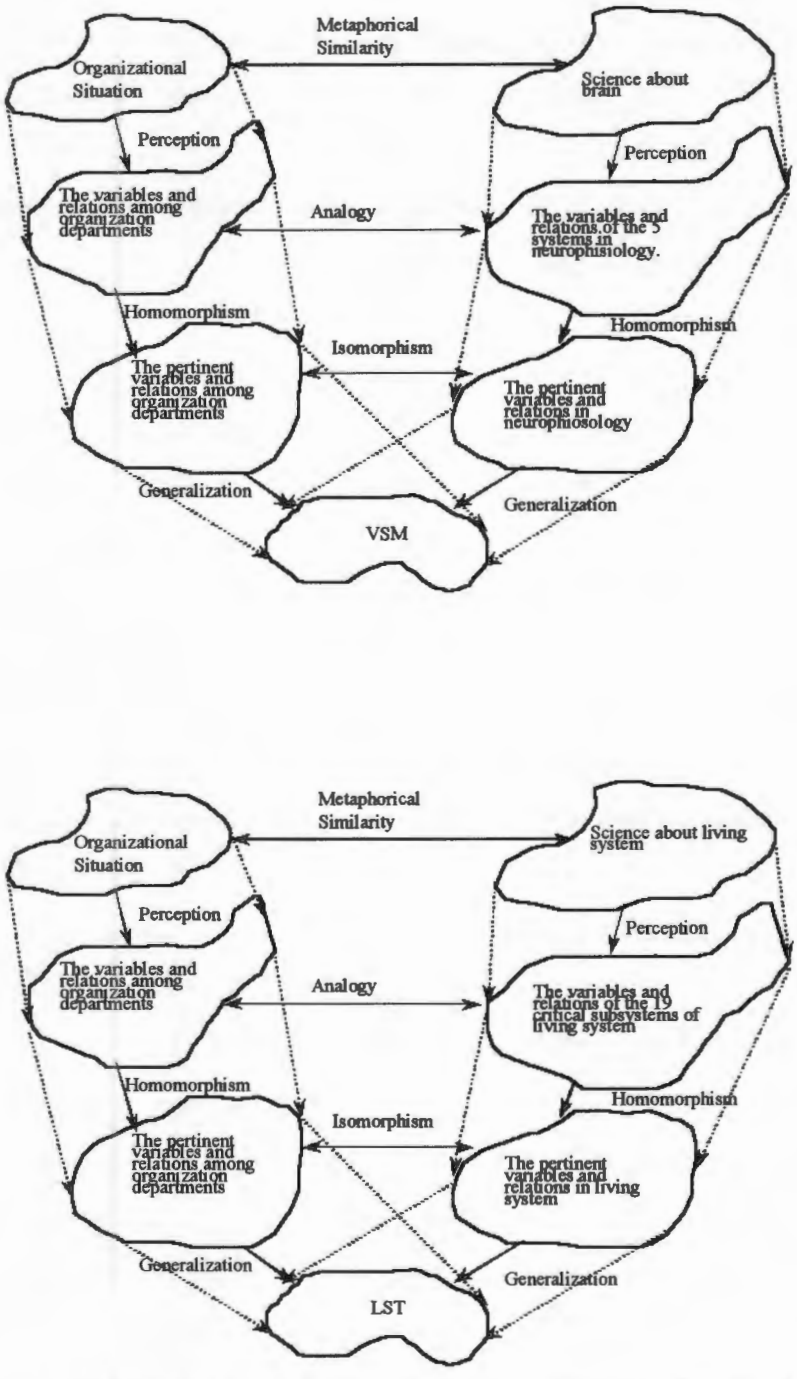


Figure 3-3: The Similar Model Development between LST and VSM

(1) System 5 is equal to *decider*.

(2) System 4 is considered as equivalent to *associator*, *memory*, *input transducer*, *decoder* and *output transducer*.

(3) System 3 would be equal to *internal transducer*, *decoder* and *associator*.

(4) System 2 would be the nearest equivalent to *internal transducer*, and certain function of *decoder*.

(5) System 1 can be assumed to control *ingestor*, *distributor*, *converter*, *producer*, *matter-energy storage* and *extruder*.

From the above summary, we can see how the subsystems of LST and VSM correspond to one another. The decider, or system 5, always retains its individuality; i.e., it individually exists, rather than being a merging of several functions. System 4 and system 3 have a shared critical subsystem – *associator*. This shows that *associator* has a dual role – intelligence and planning. Although *channel and net* is not present in the foregoing categorization, it indeed exists in each of the 5 systems. Furthermore, all the matter-energy-processing subsystems are simply included in system 1. No specified description is mentioned about how a viable system processes matter-energy within system 1. It is apparent that VSM is more concerned with information transmitting. However, because of the common underpinning organic metaphor, both developed models hold similar ideas regarding the essential subsystems of an organization.

3.3.2.4 System Dynamic Modeling (SDM)

Forrester (1961) created a subject area that was originally known as 'Industrial Dynamics'. It is now referred to as 'System Dynamics'. Its purpose is to build models that represent the real world, and to study the dynamic behaviour of interested systems. Through the lens of System Dynamics the world is seen as comprising mutually-interacting elements where input, throughput, output and feedback are the impulses of transformation or change. It remains in a state of 'flux'; therefore, 'time' is a main concern of SDM. The system components are studied in order to understand their dynamic behaviours over time.

There are three basic components in the diagram of SDM. The three components embrace

the features of 'interdependent', 'cybernetic' and 'learning' of the organicism metaphor. The first component is 'resource flow'. The resource could include material, people, money, knowledge and so forth. It is the fundamental process that converts resource between state, which is alternatively known as *levels* or *stocks*. The *levels* are controlled by *rate* variables that directly increase or deplete the resource level. Conversely, the *levels* can affect the rate variables by building a feedback loop. Furthermore, the flowing of resource shows that a system is composed of subsystems that receive the resource, convert the resource and then deliver the resource. The subsystems are divided by the second components, known as the 'organizational boundary'. The main purpose of the organizational boundary is to clarify which organization or which people control each of the rate variables in the process. At last, the diagram is animated by the third component –'information flow'. The information flow establishes a closed loop, which specifies the rule that affects the rate variables. The 'interaction' between the rate variables, the level, the information flow and the organizational boundary dictate the system variables towards equilibrium, decline or growth. The tendency is determined by the feedback loop. If the net effect of all individual influence links in a feedback loop that is negative, then the whole loop is negative, i.e., towards steady state (goal-seeking). Conversely, if the net effect is positive, then the whole loop is positive, i.e., deviating from steady state. Now we can see that the characteristics of 'interaction', 'feedback loop' and 'goal-seeking' in SDM manifest the features of 'interdependent', 'cybernetic' and 'learning'.

Unlike LST and VSM, which pre-shape the structural subsystems of an organization, the model-generating process of SDM is dependent on the model builder's view. In a certain sense, organization structure is not strictly constructed as either LST or VSM. Rather, successive refinements to model parameters and structures are made until the model achieves the objective of design. As Wolstenholme (1990, p. 4) mentions, SDM is divided into two parts. The first part is 'qualitative' system dynamics. The second part is 'quantitative' system dynamics. The second part of SDM is concerned with equation formulation, simulation and policy analysis. The objective of equation formulation is to determine the governing equation, which controls the ways that system components mutually influence. The chief purpose of simulation is to examine how the chosen

variables fluctuate over time. The dynamic behaviour of the interested variables is presented in the simulation result, which assists us to make policy. However, the first part is concerned with the creating process and the information structure of the organization, marking the organization boundary and creating a feedback loop. These activities closely relate to the model builder's view of the problem. The use of a qualitative System Dynamics diagram to structure a problem has much in common with soft system problem-solving (see Ackoff, 1974a; Checkland, 1979a, 1979b; Rosenhead, 1996). Their efforts aimed at constructing conceptual models through the consensus of the stakeholders to denote the real world problem. Qualitative modeling manifests an important feature of organization; i.e., it embraces people's views and perceptions. People's views and perceptions regarding the organization's problem have to be precedent to quantitative simulation. This concept shows the importance of taking human's mental activity into account during the design. It reveals the need for looking at the organization through a different lens to identify the organization's *will*. In this regard, the social system metaphor makes a stand for understanding the organization's purposeful behaviour.

3.3.3 The Social System Metaphor

The foregoing section mentioned two metaphorical conceptualizations of organization - mechanistic and organic organization, both of which are concerned with the structural aspect of an organization. A remarkable feature of organization is not revealed in their underpinned philosophy (Pepper's *World Hypotheses*, 1942). The feature is human's purposeful mind.

According to the foregoing definition of organization, organization is constituted of people, rather than of other organisms. There is a discrepancy between human and other organisms, although they posses similar structural characteristics. Human has perception, norm, value and ethic, all of which have a role to play in purposeful behaviour, whereas organisms or animals have only self-awareness, which is purposeless. The purpose here does not amount to Miller's definition of purpose. Miller (1978, p. 40) elucidates the meanings of purpose as, firstly, the function or role of the system in the suprasystem, and, secondly, the internally-determined control process of the system, which maintains one of

its variables at a given steady state value. For Miller, purpose is the objective or function that should be achieved. In contrast, Ackoff and Emery (1972, p. 31) define a purposeful system as 'one that can change its goals in contrast to environmental condition; it selects goals as well as the means by which to pursue them.' A purposeful system thus displays *will*. Human beings are the most familiar examples of such systems. One can use human beings and human pets as examples to explain the concept of purposeful system. When our dogs are hungry, they do not determine what they will eat for supper. Instead, we decide what they are going to eat. Thus, they can eat only what we feed them. We, on the other hand, can decide to eat fish, steak, vegetables, chicken or the like for supper. Moreover, we can decide whether the purpose of our life is to become a scientist or artist or whatever, while our pets cannot determine the purpose of their lives. It can be seen that we as humans have choices (*will*), while other organisms do not.

This difference is also reflected in Boulding's (1956) categorization of systems. Boulding categorizes system into 9 levels: (1) static structure, (2) simple dynamic system, (3) cybernetic system, (4) open system, (5) genetic-societal, (6) animal, (7) human, (8) social organizations. For Boulding, animal is characterized by increased mobility, teleological behaviour and self-awareness. He says: 'Here we have the development of specialized information-receptors (eyes, ears, etc.) leading to an enormous increase in the intake of information; we have also a great development of nervous systems, leading ultimately to the brain, as an organizer of the information intake into a knowledge structure or "image". Increasingly as we ascend the scale of animal life, behaviour is response not to a specific stimulus but to an "image" or knowledge structure or view of the environment as a whole'. However, he describes human as follows: 'In addition to all, or nearly all, of the characteristics of animal systems man possesses self-consciousness, which is something different from mere awareness. His image, besides being much more complex than that even of the higher animals, has a self-reflexive quality – he not only knows, but knows what he knows. .... Man is distinguished from the animals also by a much more elaborate image of time and relationship; man is probably the only organization that knows he dies, that contemplates in his behaviour a whole life span, and more than a life span. Man exists not only in time and space but in history, and his behaviour is profoundly affected by his view of the time process in which he stands.' Accordingly, the remarkable discrepancy

between human and organism is that human has 'mind' and it shapes part of an organization's characteristics.

Vickers (1963) coins the term 'appreciative behaviour' to denote human's purposeful mind. It is an unobservable reality. The miscellaneous ways of interpreting human's mind activity are indeed two sides of the same coin. In brief, human has norm, value, appreciative behaviour and perception. These profoundly affect organization behaviour. The influence of human mind on organization behaviour can be understood in terms of certain phenomena, such as organization culture, politics and domination.

Morgan (1986, p. 112) points out that culture refers to the pattern of development reflected in a society's system knowledge, ideology, values, laws, and day-to-day ritual. Olsen (1991, p.55) similarly explains that culture refers to the total 'way of life' of a group of people. It includes the tools they use, the food they eat, the clothes they wear, their family patterns, their governmental practice, their religion, and all other aspects of social life. Olsen further classifies four principal components of cultures: (1) beliefs, (2) values, (3) norms, and (4) technologies. In organization or society, the characteristics of the four components are manifested by:

(1) What is right?
(2) What should be done?
(3) What are we going to do?
(4) How are we going to do it?

Olsen's elucidation shows that the driving force of culture is people's belief, which is constituted of our values and norms. Our belief guides us to judge what behaviour is right or wrong. It further develops the shared standards regarding acceptable and unacceptable behaviour. The mechanism of implementing such standards is reflected in our law, custom, organization structure and so forth. Hence, from the cultural perspective, organization performance and behaviours are dictated by people's shared belief. For example, Morgan (1986, p. 114) illustrates why the Japanese economy is successful from a cultural perspective. He points out that the cultural value of the rice field (co-operative

and team work), with the spirit of service of the samurai (willing to share), accounts for its success. The example shows the influence of human mind on culture, which in turn affects organization behaviour and performance.

Another way of perceiving organization is politics. Politics consists of games played by many actors. The actors influence organization behaviour through their interests, conceptions and perceptions. Allison (1969, p. 698) uses the Cuban missile crisis to illustrate how the politics paradigm influences decision. He says: '... the bureaucratic politics model sees no unitary actors but rather many actors as players, who focus not on a single strategic issue but on many diverse intra-national problems as well, in terms of no consistent set of strategic objectives but rather according to various conceptions of national, organizational, and personal goals, making government decisions not by rational choice but by pulling and hauling that is politics'. Allison's argument highlights 'no consistent objective' and 'various conceptions'. 'No consistent objective' implies that each player has his own goal and preference. 'Various conceptions' connotes diversified views towards a problem. This reveals that, through the lens of the political paradigm, human mind is the source from which organization behaviour is affected. Likewise, Linstone (1984, p. 47) suggests that one looks at the bureaucratic politic through the organization's perspective, where, for example, there might be concern as to whether a new policy would constitute a threat to an organization privilege. This perspective is associated with 'power'.

Domination is obviously a result of mind activities. Morgan (1986, p. 275) writes: '... throughout history organization has been associated with the process of social domination where individuals or groups find ways of imposing their will on others'. Morgan uses the construction of the Great Pyramid of Giza as an example to illustrate how labours and resources are deprived to satisfy a few people's glories. He shows that a few people's minds can influence organization. They can succeed in strictly controlling human actions. The means of control are reflected in rules, organization structure and so forth.

Cumulatively, the above illustration about human mind manifests that human mind is an essential part of organization. It is concealed in organization. It is not observable or tangible, unlike organization structure, which is describable. However, it can give rise to

considerable impact on organization behaviour. Hence, human mind is one of the primary determinants of organization behaviour. It should be taken into account when we deal with an organization's problems.

3.4 Conclusion

Through the lens of the metaphor theory, we can see how people's perceptions of organization influence organization design. Mechanism and organicism concern themselves with organization structure. They are involved in the construction of a model that can enable an organization 'rationally' to achieve high performance. Mechanism emphasizes a strict 'hierarchical order', whereas organicism emphasizes 'interrelationship' and 'cybernetics'. The breaking through of organicism leads to evolution into 'social system'. In the social system metaphor, the parts of an organization (human) are recognized as 'purposeful system'. Its primary concern is with human mind - value, norm, belief and so forth. It hints that 'consensus' and 'cooperation' are necessary in designing a system.

We can see that the evolution of metaphorical conceptualization contains an ontological element - 'incorporating'. It means when the old concept is no longer adequate, its axioms are not completely discarded when the new one is accepted. Indeed, the new concept differs from the old in that it contains certain properties of the world that had not been uncovered before. Boulding's (1956) general system theory helps us to interpret 'incorporating'. The systems before and including level two - 'the simple dynamic system' - belong to the concept of mechanism. Between level two and level six are the discovered properties in the organic worldview. But this does not mean that the organic worldview excludes the concept of 'static element' and 'dynamic behaviour' (changing). In the organism, the individual entities also exist and the whole is 'changing', i.e., towards deterioration or maximum entropy. However, certain features are founded between the parts, i.e., feedback, goal-seeking and open system behaviour. The 'ontological elements' are animated by the discovered new properties. Level seven (human) and level eight (social organization) emerge with a new feature, i.e., *will* (purposeful behaviour). But it does not mean that the concepts of 'individual entities', 'changing', 'feedback', 'goal-seeking' and 'open system behaviour' in the system

above/including level seven do not hold. Rather, they should be incorporated into the concepts of the higher level system, and integrated with the 'emergence' property – *will*.

Cumulatively, organization function and people's perception are inseparable components for dealing with an organization problem. However, the primary interests of functionalistic streams, including mechanism and organism doctrines, disregard human issue as an inseparable part. Particularly, the mechanistic concept is questioned regarding its mechanistic paradigm, which is incompetent to cope with the contemporary situation, i.e., the increasing complexity in our society. The reason for the increasing criticism is discussed in the next chapter. The criticism reflects dissatisfaction with mechanistic doctrine. Peirce calls this dissatisfaction 'doubt'.

Chapter 4 The Doubts about Bureaucratic Organization

'If people be led by laws, and uniformity sought to be given them by punishment, they will try to avoid the punishment, but have no sense of shame. If they be led by virtue, and uniformity sought to be given them by the rules of propriety, they will have the sense of shame, and moreover will become good'.
- *Confucius Analects: II/3, ca. 400BC*

This chapter provides an overview of the doubts about bureaucratic organization. The doubts are reflected in the criticism of surveyed literatures. The surveyed literatures reveal that the criticism principally falls into the categories of humanity, structure, learning, adaptability and rationality. We consult the ancient oriental classics to illustrate the criticism of humanity. In turn, we discuss the criticism of sociologists and systems thinkers as regards structure, learning and rationality. The critics lead us to survey the diversified approaches to intervening in bureaucracy problems. The survey shows that the proposed approaches are relevant to those writers' interests. Some scholars believe that restructuring an organization is an effective way of eliminating the problems. In a sense, they believe that the problems are in the organization structure. In contrast, other scholars believe that democracy, intelligence and transformation of the paradigm are the essential ways to intervene in bureaucracy problems. We also review a supporting voice for bureaucracy. The voice stresses several merits of bureaucracy theory. But, parts of the merits are deemed as defects from the critics' perspective. The survey of diverse criticism leads us to think how we can surface the real problems, which cover a broad span of views, rather than arguing in a narrow span of discipline. For example, an effective organization, in some circumstances, is not so because it has a remarkable organization structure. Instead, it can have an lofty culture. Thus, we need to reconcile different concepts about organization. We propose a concept in Chapter 5 to reconcile different views regarding the solving of problems in bureaucratic organization.

In the past, bureaucratic organization was very successful and prospered under conditions that were similar to the Industrial Revolution. The key was an invariant environment. During the Industrial Revolution, people's minds were managed as machines to perform regular tasks. The iron-clad rules discounted human values and minds. But, today, many

people have been aggrieved by bureaucratic types of administration. Their complaints usually focus on details such as inflexibility, perceived poor efficiency, poor service attitude and so forth. In this section, the research reviews some works that discuss the inadequate mechanistic notion of bureaucracy. In addition, this section surveys some proposed solutions and applications for tackling bureaucracy problems. Finally, this chapter reviews the opinion that supports bureaucracy. The review leads us to seek a more comprehensive concept to surface the real problems of a bureaucracy.

4.1 The Doubts on Bureaucracy

4.1.1 About Humanity

Weber points out a characteristic of bureaucracy; i.e., there is the principle of fixed and official executive areas, which are generally ordered by rules, by laws or administrative regulations (see Weber, 1948). However, from the Confucian perspective (see the above quotation), the rigid rules and regulations do not enhance ethical behaviour. The rules and laws define clearly the punishment and award, which drive people to act as machines and commit themselves to playing their roles in the organization. People's behaviour is compelled and conquered to comply with the inflexible regulations, which, in essence, do not advance people's ethic. 'Humanity' is conceived as inferior to rationality. Therefore, one of the cultural characteristics of mechanistic concepts is *obedience*. In certain senses, the organization obeys the mechanistic rules to proceed. Our consciences and humanity are not recognized as the principles to guide our behaviour. For example, a particular charitable organization accommodates homeless children because the law requires it and how members perceive the homeless children is not the primary concern. We cannot deny that rules and regulations are important and necessary. But, an ethical inspiration as a cultural basis is indispensable in moving an organization forward.

On the other hand, the humanity issue reflects the incompleteness of the conventional approach of science: empirical observation and logic. Empirical observation is about our sensibility. Logic is about our rationality. The two components mutually complement each other. When we structure our experiential data, it must be logical. But logical

reasoning does not ensure ethic. For example, it is forbidden to drive a private car through a red light. Only ambulances, fire trucks and police cars are permitted to do so, and only in cases of emergency. Thus, if a person drives a private car through a red light, it is deemed a legal offence. But, if we transport a heart attack victim to hospital in a private car, the logical law will become the risk to the victim's life. In this situation logic or rationality does not work. Our decision should be grounded in our consciences. However, our actions, which are based on conscience, might be seen as a violation of 'impersonal relation'.

4.1.2 About Structural Aspects

The mechanistic structure of a bureaucratic organization is vulnerable to the questioning of its efficiency in processing information and communication. Pinchot (1994, p. 37) gives several reasons why bureaucracy fails. One of the reasons is that it is unable to provide appropriate cross-functional communication. This is mainly ascribed to the long hierarchical communication channel. Additionally, Olsen (1991, p. 367) stresses the problem of communication distortion in a bureaucratic organization. It is attributed to the hierarchical structure, in which the information is interpreted and elaborated as it flows down or flows up. When information reaches its destination, it has little resemblance to its original.

Beer (1981) sees the problems of orthodox structure (bureaucratic structure) from the viewpoint of 'control'. Beer's arguments are:

(1) The autocratic entrepreneurs will delegate the things that they least enjoy doing. The control of the firm is a function of these different types of people interacting with one another, and nothing more.
(2) However, the manager is no longer the arbiter of sophistication in control because there exists today a capacity to cope with information vastly in excess of the human capacity.
(3) Cumulatively the above two reasons, coupled with the simplifying language represented by the orthodox approach, often leads to disaster.

Beer uses an orthodox organization chart to illustrate the probability of a correct decision being made. Considering Figure 3-1, suppose that the probability of a correct decision made by the supervisor, top-level manager and executive were 0.7, 0.8 and 0.9 respectively. (Here, we assume that the operational staff members do not participate in decision-making.) When a decision needs to be made, the executive will ask for the top-level manager's advice; similarly, the top-level manager will ask for the supervisor's advice. The premise of a correct decision being made by a top-level manager is based on the correct concord among the supervisors. Hence, top-level manager 1 has a probability of 0.343 of receiving the correct advice. The probability of the top-level manager passing on the right advice to the executive is no more than 0.274. The probability that the three top-level managers will all be independently right is just 0.02. At last, the probability of a correct decision made by the executive is the multiplication of 0.9 and 0.02. There is no more than a 0.018 probability that the executive will be finally right!

Williamson (1967) has conducted research on the optimal level of bureaucracy. The research is concerned with the optimal number of hierarchical levels in terms of maximized net revenue. The research reveals that the optimal structure is as follows:

$$n^* = 1 + \frac{1}{ln\alpha}\left[ln\frac{w_o}{P-r} + ln\frac{s}{s-\beta} + ln\left(\frac{lns}{ln(\alpha s)}\right)\right] \qquad (4.1)$$

where

n = number of hierarchical level
α = fraction of work done by a subordinate who contributes to the objectives of his superior
w_o = wage of production workers
P = price of output
r = non-wage variable cost per unit output
s = span of control
β = the salary ratio of each superior to his immediate subordinates

The optimal level of hierarchy is associated with the capacity of a superior to supervise subordinates (s), the salary ration of superior to the subordinate and so forth. Williamson's research shows that as a bureaucratic firm grows over the size of optimal level, the return to scale will start to diminish. The research also reflects that the larger a mechanistic organization becomes, the weaker is the control over its actions exercised by

those at the top. Hence, we will not obtain benefits as the mechanistic structure expands over the optimal point.

From the above literature, we can see that the major problems of bureaucratic structure are to convey information without losing quality and to make correct decisions and to control the organization (particularly when it grows over a certain size). Though the hierarchical structure provides the advantage of 'accountability' (see Olsen, 1991), Beer (1981) deems it just competent to apportion blame.

4.1.3 About Learning and Adaptability

Another problem of bureaucratic organization is the lack of intelligence. It has no capability to learn and undertake self-regulating. This leads it to function as a goal-achieving device, rather than a goal-seeking system. This is primarily caused by its following rigid rules in a strict manner. Besides, the red tape of rigid rules may deter it from reacting to environment change simultaneously. Olsen (1991, p. 366) outlines these problems in terms of:

(1) rule reutilization, which means that bureaucracy follows the rulebook in a rigid and inflexible manner;
(2) impersonal treatment, which connotes that bureaucracy ignores the external customers' needs, this consequently leading to the distress and disappointment of external customers;
(3) goal displacement, which indicates that bureaucracy tends to concern itself with internal goals rather than with external goals. Consequently, the external customer's needs are ignored;
(4) resistance to change, ascribed to the rigid rules, which dampens growth.

Olsen's critics indicate that iron-clad rules impede a bureaucratic organization from changing its behaviour for the purpose of adaptability. Thus, the external situation is not taken into account when the organization takes action. This situation induces goal displacement that focuses on only internal goals. It eventually provokes grievances at the 'impersonal' treatment within the organization.

On the other hand, Barzelay (1992) illustrates the bureaucratic paradigm and highlights its inflexible nature. He points out that the old mechanistic basis of the bureaucratic paradigm is:

(1) focus on the way things have been;
(2) focus on operating the system and preparing to say no;
(3) caring about current rules and technical expertise;
(4) focus on the volume and cost of input and
(5) caring about roles and responsibilities.

The bureaucratic paradigm shows that environment is not a primary concern. Instead, the internal need is the major consideration. It gradually causes bureaucracy to lose its capacity for adaptability.

Morgan (1986, p. 35) also pinpoints the limitations of mechanistic organization. The limitations are about adaptability and learning. He says that in particular they:

(1) can create organizational forms that have great difficulty in adapting to changing circumstances;
(2) can result in mindless and unquestioning bureaucracy;
(3) can have unanticipated and undesirable consequences as the interests of those working in the organization take precedence over the goals the organization was designed to achieve; and
(4) can have dehumanizing effects upon employees, especially those at the lower levels of the organization hierarchy.

Morgan's criticisms indicate that the lack of adaptability can cause an incapability to learn, which further results in goal displacement and dehumanization. This is ascribed to the essence of mechanistic structure, which is designed to achieve predetermined goals, rather than designed for innovation. It is usually a single-purpose mechanism, which is designed to transform specific inputs into specific outputs. It can only engage in different

activities if they are explicitly modified or redesigned for the purpose.

Benveniste (1987) describes 'rules' as a 'fantastic' invention. Yet, rules can only work well when the future is predictable, unvaried, and repetitive. Rules do not work when a situation is not clear as to what should be done and how it should be done, when tasks are varied and unpredictable, and when the rules do not fit reality. Rules and routines can eliminate discretion. When 'learning' and 'adaptability' are important, rules can constrain our ability to solve problems.

Cumulatively, it is apparent that the major factors that cause a bureaucratic organization to be unable to learn and to adapt to environment change are the rigid rules. People are driven by the mechanistic rule to perform actions. Consequently, human intelligence is conquered by the mechanistic rulebook. At last, it leads an organization to lose its adaptability and capability for learning.

4.1.4 About Human Rationality

Bureaucracy very much relies on rational procedure to make decisions. The rulebook serves as a rational tool, which guides people to perform actions. However, Simon (1976) identifies at least three ways in which objective rationality fails:

(1) incomplete knowledge to discover the consequence of each choice;
(2) imperfect anticipation of value in the future;
(3) limited alternatives brought to mind.

Simon's argument shows that means-end analysis, which is defined as a series of causally related elements ranging from behaviours to the values consequent of them, is limited, owing to human's incapacity for rationality. Rationality requires a complete knowledge and an anticipation of the consequences that will follow each alternative. However, knowledge of a consequence is always fragmentary. How a change in administration procedure, for example, will exactly influence fire protection is very difficult to disclose, owing to our limited knowledge of the probability of fire in each portion of a city. Inasmuch as the influence lies in the future, imagination must augment one's limited

knowledge. Consequently, value can be only imperfectly anticipated. Besides, very few of all the possible alternatives ever come to mind when a decision is made. In the fire protection example, we cannot anticipate all the possible changes in administration procedure necessary for evaluating the consequence.

Thus, anticipation of all possible events and alternatives is almost impossible. This is why the rulebook does not work in some circumstances. It is because external conditions are not taken into account. It is the reason why law is continuously amended. The old system of law is not able to cope with the new crimes, because we cannot conceive of how many different crimes could appear in the future.

Olsen (1991, p. 353) interprets Weber's idea of bureaucratization as an 'ideal type'. An ideal type is a model of a social process or organization that identifies its most distinctive characteristics and exaggerates them to their maximum possible condition. Abrahamsson (1993, p. 40) also mentions that Weber's concept of bureaucracy is a 'construct', a unit of comparison, an 'idealized' norm against which different forms of organization can be compared and contrasted and against which deviations can be measured. Their interpretations intimate that 'fully rational' is merely an 'ideal type'. Thus, no social organization ever achieves its ideal type, owing to human's rational incapacity to envisage all possible events.

4.1.5 Summary of the Doubts about Bureaucracy

The foregoing doubts about bureaucracy show the inappropriateness of traditional bureaucracy theory in the present age. The primary criticisms are concerned with its inability to deal with the human dimension, its inappropriate structure, which prevents it from processing information efficiently and keeping it undistorted in the information channel, and its inability to use human attributes effectively to deal with challenges to its viability.

These doubts reflect the dissatisfied state of opinion and generate incentives for the researchers to seek a new state of belief. A number of theories and applications have been put forward or tested for settling the unsteady state of doubt. The next section reviews

these theories and applications. Through the reviews we find that the passage of settling belief is dependent on each researcher's perception and interest.

4.2 The Efforts of Seeking New Belief

4.2.1 Abrahamsson

Abrahamsson (1993) explores the theories of Marx. and R. Michels. on the emergence of bureaucracy and makes comparisons between the two theories. Abrahamsson illustrates that Marxist tradition sees bureaucracy as tied to an outer force (capitalism, economics, technology, and politics), whereas Michels believes that bureaucracy stems from an inner process; i.e. organization in itself leads to oligarchy. In other words, Marx contends that bureaucracy is a *bourgeois* phenomenon. In contrast, Michels deems that the various administrative deformation processes tend to bring about an autonomous social category, i.e., an oligarchy. The different views on the sources of bureaucracy have led to the development of different approaches to tackling its problems.

Abrahamsson suggests that the struggle against bureaucracy has to take place on two levels simultaneously:

(1) The dependence of organization on external force sets certain limits for the measures that can be taken against bureaucracy. Conversely, to the degree that organized groups of citizens can liberate themselves from the confinement of material and other factors, their power to control and exert power over the executive is strengthened.
(2) It is quite possible that even a very small group in the leadership of the organization, because of good contacts with lower-level members, can reach decisions that are in accordance with the goals and interests of the mandators/participants. The only guarantee for this contact with the non-executive levels and the only safeguard for this connection between the mandators' goal and the administration's day-to-day decisions is a broad participation among all organization members in the governing of their own affairs.

Though Marx believes that the solution to bureaucracy problems is 'revolution',

Abrahamsson provides a softer resolution. Inasmuch as outer force is the cause of bureaucracy, the less an organization is confined by external force the more power it has against bureaucracy. Hence, Abrahamsson postulates that an increase in economic productivity in an organization and in society at large creates the possibility of reducing working hours. Consequently, greater freedom can be gained to organize for the improvement of working conditions. Besides, economic development also provides the basis for the improvement of education and culture. In turn, these may become the foundation for a criticism of the existing production relations, and for the rational and deliberate changing of these relations. To Abrahamsson, economic relationships that impede the development toward greater equality and a heightened quality of life constitute the material bases of bureaucracy. Thus the elimination of bureaucracy, in the long run, is intimately connected with the development of productive force.

On the other hand, the outcome of the struggle against bureaucracy depends on whether the executive group can be prevented from usurping the power of its special positions. Abrahamsson points out that elite responsiveness can exist even in a system where the participation of citizens in politics is limited to the election of representatives at certain intervals. The less the citizens participate in politics, the more the people become dependent on the benevolence of the 'elite' and its motivation to respond to popular will. Furthermore, people become dependent on a well-functioning competition among the elite. Thus, a participative system could decrease this dependency and provide the possibilities for continuous control of the executive in order to eliminate oligarchy.

4.2.2 Ackoff

Abrahamsson's work was published in Europe in 1975. In the same era, Ackoff (1974a, 1974b) proposed interactive planning, which was designed to bring consensus among the stakeholders. He suggested that broad participation of stakeholders could bring democracy to an organization. A further purpose was to decrease bureaucratization. Abrahamsson's second proposition against bureaucracy and Ackoff's idea about interactive planning are rather like two sides of the same coin. Both of them strive to prevent lower level people from being deprived by the elite in order that a co-operative future might be established.

In addition, Ackoff proposes 'circular organization' to provide broad participation for bringing democracy to an organization. Figure 4-1 exemplifies a simplified three-level circular organization. Each box in this chart represents an organization unit headed by a manager. Given that each manager has a board, the possible composition of the board could consist of the manager of the unit, the next lower level managers, who report to him, and the next higher level manager, who acts as chairman of this board. The function of the boards would be not to manage, but instead to carry out two major functions: to establish principles and policies under which the managers reporting to them should operate, and to evaluate the performance of the managers and to remove them if necessary. On the other hand, no manager could remove a subordinate without agreement of the board to which that subordinate reports. Furthermore, this mechanism shows that each manager's performance would be evaluated by those immediately below him, as well as by his boss. We can see that Ackoff's objective is to reform the centralized decision-making of a bureaucratic organization. Through the slight change to the linear bureaucratic structure, the proposed circular organization attempts to enhance humanization and participation in a bureaucratic organization. Consequently, decisions are made through broad participation. Policies are formulated through cooperation, rather than being dependent on the preferences of a few of the elite.

4.2.3 Miller, Ruscoe *et al*

After Miller (1978) proposed LST, a large scale application of LST to a number of U.S. army battalions was undertaken by Ruscoe *et al* (1985). Subsequently, Bryant *et al* (1987), and Merker *et al* (1987) applied the same framework to a public transit system and an urban hospital respectively. The primary purpose of Ruscoe's research was to identify and relate the efficiency of the critical organizational processes of the battalion to the overall battalion effectiveness. The data were collected from 5,170 individual personnel in 35 battalions of the U.S. Army. Thirteen of the units were stationed in the United States and the other 22 in Germany.

The research focused on four variables, which characterized the 19 critical processes. The four variables were:

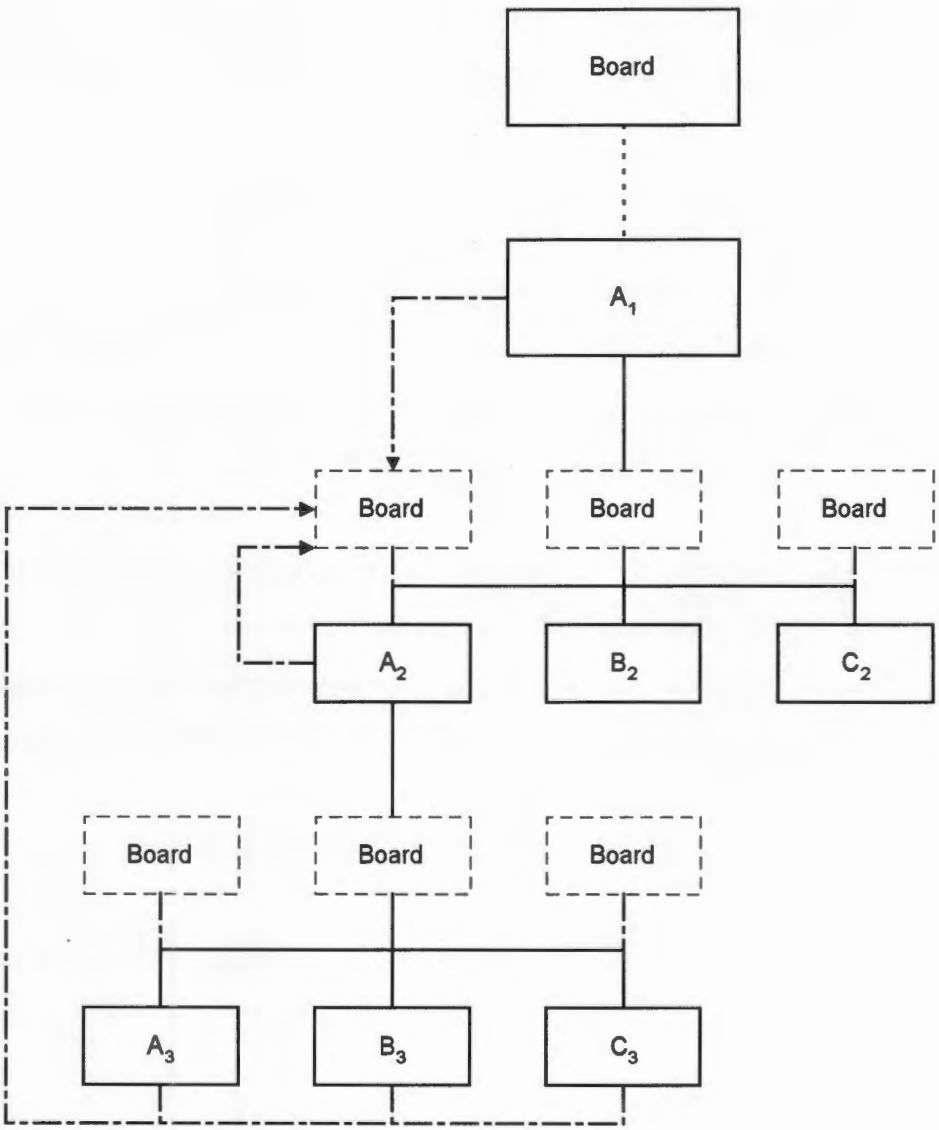


Figure 4-1: A Circular Organization
(Source: Ackoff, 1974b)

(1) process states (how well a process was carried out, as perceived by battalion members);
(2) process importance (how battalion members ranked a process in terms of importance in carrying out their jobs);
(3) process time (how battalion members spent their time across the process), and
(4) process performance (how battalion members evaluated each process in terms of usefulness, accuracy, timeliness, cost and volume).

The survey was for obtaining perceptual data relating to the respondents' perceptions toward critical processes. Indicators of the above variables were: the respondents' evaluations of the LST process, both in terms of the battalion as a whole and in terms of their own jobs; the amount of 'time' that was spent on each of the processes; and how the respondents 'ranked' the processes in terms of importance.

For seeking the relations between organization effectiveness and process efficiency, the research sought to identify measurements of effectiveness to examine its correlation with efficiency. The research determined to use composite data collected by the army as indicators of unit effectiveness. The data fell into three categories: performance indicators (such as the percentage of equipment ready), command indicators (such as the percentage of adverse personnel actions), and perception indicators (such as the percentage of battalion personnel who felt that the unit was ready to go to war). A composite formula of these indicators was used to determine Battalion Effectiveness Ranking (BER): BER = 1/6 (Command Indicators) + 1/3 (Performance Indicators) + 1/2 (Perception Data).

The research found that battalions that ranked high in traditional effectiveness measurement also tended to rank high in the various process-efficiency ratings. For example, the LST data on the more effective battalions suggested that they processed information in a more timely manner and information was perceived to be more accurate and more important than in the less effective battalions. Through studying three areas of the battalions' activities - training, logistic, and personnel - the findings were noteworthy. They indicated that the more effective units spent more time on information processing.

The data on personnel activity in information processing were consistent . Regarding training activities, the accuracy of information in two processes – the monitoring of training activities (internal transducer) and the making of decisions to regulate these activities (decider) – considerably influenced the effectiveness of the units. In the logistic activities, the timeliness with which logistic information was brought into each battalion (input transducer), circulated (channel and net), stored (memory) and retrieved (encoder), was particularly crucial to the effectiveness of that battalion. In personnel activities, four processes were found to be significant for understanding unit effectiveness: input transducer, channel and net, decoder and associator.

The research findings revealed that the less effective units were inefficient in some information-processing activities. These findings provided the ineffective battalions with guidelines for taking remedy action. However, the research was less definitive on the relations between matter-energy processing and unit effectiveness. It showed that there were no significant relations between them.

The application shows how LST can be used to diagnose bureaucratic organizations such as army battalions. Its primary concern is organization structure. Thus, it seeks bureaucratic problems within its structure. The research result reveals that an effective organization is dependent on the efficient processing of information.

4.2.4 Beer, Searâ

After Beer (1981) had devised VSM and applied it to the government structure in Chile, VSM was applied to numerous organizations, such as the application to New Zealand Telecom, conducted by Brocklesby and Cummings (1996). In addition, a remarkably large-scale application of VSM was implemented by Searâ (see contribution paper to Espejo and Markus, 1993) for the second largest producer and exporter of iron ore in Brazil – and the fifth largest producer of iron ore in the world - Minerrações Reunidas S/A (MBR).

The objective of the above application was to transform the MBR organization structure

in accordance with the principles of VSM. Before the restructuring started, MBR's organization structure was a linear hierarchy. But during 1982, as a result of an international trade crisis over the export of iron ore, the Operation Office started to introduce operation and management changes in MBR. The changes in structure included MBR's suprasystem, which was Companhia Auxiliar de Empresa de Mineração (CAEMI). The restructuring process unfolded CAEMI into a four-recursion structure, where MBR constituted the third recursive level.

The operational units, which made up system 1 (S-1) of MBR, encompassed the company's technological activities, which comprised three iron ore mines and the sea terminal. Their function was to transform MBR's iron ore deposits into the products sold overseas and on the home market. A Production Division (System 3 or S-3) carried out the control of operational activities in each unit. This division was structured so as to absorb the relevant complexity that was generated in the internal environment by the unit's production and services-selling activities. The control function of MBR was distributed in subsystems at all structural levels, such as the above-mentioned Production Division. At the corporate level, the control system (S-3) comprised the activities of three offices: Commercial, Comptroller and Operation. Co-ordination (System 2 or S-2) was included in the activities to cushion possible oscillation among the units. Furthermore, the S-2 served a monitoring function for avoiding breaks in communication between this level and the management of operations at successive levels. The MBR's intelligence function (System 4 or S-4) had several roles: to monitor environmental change, to draw up and propose measures to the policy-makers and to manage the innovation and change process. The intelligence function of MBR was comprised of four departments: Geological and Technological Research, Engineering, Computer Information Systems Development and Human Resources Development. These departments looked into the organization's future and made feasible plans so that MBR would adapt to new situations. MBR's policy function (System 5 or S-5) had to absorb residual complexity remaining from the operation of the S3/S4 homeostat. Policy-making was the responsibility of the Board and CEO.

The application of VSM to MBR demonstrated a structural approach intervening in

bureaucratic problems. The purpose of restructuring was to enable the organization to be viable and to establish requisite variety to cope with complex situations and maintain a desirable homeostasis.

4.2.5 Benveniste

Benveniste (1987) argues that professionals will play an increasingly important role in organization in coming decades. Management will design organization around professionals in an attempt to reduce excessive bureaucratization. For professionalization tends to depend on a greater emphasis on input control, which fits into the situations where uncertainty is high and adaptive behaviour is at a premium. (Input control in a nutshell follows the following pattern: 'Here is a definition of the task. Here are the resources. Go to it and get things done!')

A professional organization differs from a conventional organization in two aspects: structural and attitudinal. The structural aspect has six features:

(1) application of skills based on technical knowledge;
(2) requirement of advanced education and training;
(3) some formal testing of competence and control on admission to profession;
(4) existence of professional association;
(5) existence of codes of conduct or ethic, and
(6) the existence of an accepted commitment or calling, or sense of responsibility, for serving the public.

On the other hand, the attitudinal aspect has five features:

(1) the belief that the professional is a significant reference group and the source of major ideas and judgements;
(2) a belief in service to the public; the idea that the profession is indispensable and that professional work benefits the public and the practitioners;
(3) a desire for autonomy in work situations;
(4) preference for self-regulation, particularly for peer control and review, and

(5) the notion of a calling, of a devotion to the work, even if few extrinsic rewards are provided.

There are few overlaps between structural elements and attitudinal elements. However, Benveniste's postulations show the importance of knowledge base and value. The postulations imply that skilful knowledge and discretion are two crucial thrusts for an organization beyond bureaucracy. Unlike in a bureaucracy, which requires people to follow rules in a discrete way, a professional organization requires that its members be equipped with professional knowledge and that they use their talent or intelligence to think of ways to tackle an unpredictable future which the organization might face. Benveniste's postulation manifests the need of 'restoring' people's intellectual minds to deal with matters arising.

4.2.6 Barzelay

Barzelay (1992) postulates that for a government to address social problems in an efficient manner, government agencies need to be administered much like business organizations. (This postulation had its roots in industrial transformation.) The concept is that government organizations should be customer-driven and service-oriented. A recurring aspiration of public managers and overseers using these concepts is to solve operational problems by transforming their organizations into responsive, user-friendly, dynamic, and competitive providers of valuable services to the customer.

Moreover, Barzelay puts forward a post-bureaucratic paradigm as a new alternative to the bureaucratic paradigm. The outline of this alternative, expressed in paired statements, is as follows:

(1) A bureaucratic agency is focused on its own needs and perspectives. A customer-driven agency is focused on customer needs and perspectives.
(2) A bureaucratic agency is focused on the roles and responsibilities of its part. A customer-driven agency is focused on enabling the whole organization to function as a team.
(3) A bureaucratic agency defines itself both by the amount of resources it controls and

by the tasks it performs. A customer-driven agency defines itself by the results it achieves for its customers.

(4) A bureaucratic agency controls costs. A customer-driven agency creates value net of cost.

(5) A bureaucratic agency adheres to routine. A customer-driven agency modifies its operations in response to the changing demands for its services.

(6) A bureaucratic agency fights for turf. A customer-driven agency competes for business.

(7) A bureaucratic agency insists on following standard procedures. A customer-driven agency builds choice into its operating systems, when doing so serves a purpose.

(8) A bureaucratic agency announces policies and plans. A customer-driven agency engages in two-way communication with its customers in order to assess and revise its operating strategy.

(9) A bureaucratic agency separates the work of thinking from that of doing. A customer-driven agency empowers front-line employees to make judgements about how to improve customer service and value.

Barzelay's postulations indicate that a cultural reformation in bureaucracy is the radical way to bring transition. The purpose of cultural reformation is to change a member's paradigm from focusing on internal need to becoming more business-oriented. Through a transformation of paradigm, one can break down bureaucracy and create a more responsive, user-friendly and competitive provider of valuable service to a customer.

4.2.7 Pinchot

Pinchot (1994) points out that the change in the nature of work results in the unfeasibility of bureaucracy. The change is towards 'knowledge work', innovation and caring, teamwork, project-based work, multi-skilled workers, the power of customers and coordination among peers. The change necessitates the use of intelligence to deal with the new nature of work. Hence, Pinchot proposes the idea of intelligent organization, which is grounded in people's intelligence, to deal with the new nature of work. Pinchot claims that the necessary conditions for an intelligent organization encompass seven points:

(1) *Widespread Truth and Right*: This implies the sharing of information so that people are well-informed. (Pinchot argues that intellect functions most effectively when it has good information to work with. For this reason, members of an organization must be protected by guarantees of their right to speak out and write to others in the organization and to go about collecting the information they need to understand and contribute to the system.)

(2) *Freedom of Enterprise*: This connotes a double-loop learning, rather than learning by rote. The decision-making is decentralized so that everyone uses his/her individual intelligence to find problems to address, to decide whose help is needed, to do work in ways that make the most of everyone's talent, knowledge and experience.

(3) *Liberated Teams*: This highlights the importance of team collaboration. Many revolutions going on in organization all have a common feature: At their core is a basic shift of day-to-day control and feedback systems from the hierarchy of command to collaboration within and among teams, such as project teams, market focus teams and quality improvement teams. They are powerful forces for integration and productivity in that they form the basic building block of any intelligent organization.

(4) *Equality and Diversity*: This implies an absence of discrimination in an organization. For liberated members of an organization to choose actions that enhance the whole, everyone must trust in the fairness of the system and be secure in a certain safety that is not derived from dependence on those in power.

(5) *Voluntary-Learning Network*: This implies a network created by the choices of people seeking the connections they need to get their work done. To achieve this, the power to decide and act must be distributed so that the organization can promote the emergence of formal organizations and encourage new cross-functional working alliances to serve the customers. Conditions are created that enable the dismantling of old and the re-emergence of new groupings, processes and structures, as new needs emerge.

(6) *Democratic Self-rule*: This means a broad participation in decision-making, i.e., to give everyone a voice in shaping and implementing the mission of an organization and in creating the context that guides, supports, and limits local freedoms. In other words, all members of an organization can contribute to aligning the activities of the

organization with fulfillment of its mission.

(7) *Limited Corporate Government*: It means that the central government of an intelligence organization is limited so that the government does not impede the vitality of the self-organizing system. The role of the center is to create the conditions that empower others to build effective enterprises, rather than to run or supervise the teams.

In brief, Pinchot's postulations stress the importance of decentralization, democracy, self-organizing and learning. Their purpose is to establish an intelligent organization, which is grounded in people's discretion to deal with business, rather than in obeying mechanistic rules.

4.3 The Supporting Voice for Bureaucracy

Although a number of literatures argue that bureaucratic organization is no longer the 'most efficient' organization, Jaques (1976, p. 2) puts forward arguments that are opposed to general opinion. Jaques argues that bureaucracies are neither centralizing nor localizing powers, are neither humanizing nor dehumanizing. They are dependent institutions, social instruments, taking their initial objectives and characteristics from the associations that employ them. Thus, Jaques maintains that the power of central government of any society should never be handed over to its bureaucrats. Those powers must remain in the hands of the governmental and other employing associations in the society. Jaques further points out that the bureaucracies that dehumanize are those that have outgrown their organization structure or have never had an adequate structure, and which are too rigidly controlled from the centre. For Jaques, the appropriate bureaucratic structure is a '20-year' hierarchy that is divided into 7 strata. The division is dependent on the level of abstraction. Each abstraction represents a particular state of work-capacity. In addition, if a division is designed and managed with due regard both for the constructive quality of human beings and for the necessary societal foundations of a liberal democracy, the divisions could be spread out through the local community to take up their proper place as intermediate institutions, serving not only local needs but central ones as well.

Jaques' arguments stress that bureaucracy is not harmful. We only need to design it adequately and properly distribute the power so that bureaucracy can act as a tool to serve our purpose. On the other hand, Jaques implicitly indicates that humanity can be designed or achieved through managerial skills. It seems that humanity and control are not problems at all, if we can adequately design a bureaucratic organization. Jaques' supporting voice indicates that the failure of bureaucracy is not because of its nature. Rather, it is due to people's misuse or misunderstanding.

4.4 Conclusion

The above surveyed literatures show diversified approaches to tackling bureaucracy problems. Both Abrahamsson and Ackoff emphasize 'participation'. The only difference between them is that Abrahamsson takes external force into account and suggests a solution that lies in the external world. Miller and the other LST researchers concern themselves with organization structure and the functions of its components. They attempt so seek the causes of pathology in organization structure and function. Beer and the other VSM researchers are also interested in the structural aspect. However, they focus on communication and control in an organization. Their purpose is to restructure organization in accordance with VSM to generate varieties and enable self-regulation. Barzelay believes that paradigm is the cause of bureaucracy problems. The solution is to reform people's paradigms towards a customer-oriented organization. On the other hand, both Pinchot and Benveniste suggest using people's intelligence and professional knowledge to deal with problems, i.e., decentralized decision-making and empowerment.

There are certain overlaps in the proposed approaches. However, we should notice that the observers' perceptions of organization and their interests influence their approaches to tackling bureaucratic organization problems. For an observer who believes that organization is like an animal or organism, the diagnosis and treatment is similar to the ways of diagnosing animal ailments. For an observer who perceives organization as an intelligent being, the treatment tends to inspire its own intelligence to deal with problems. For an observer who perceives organization as a spiritual being, the treatment is the application of 'soul treatment', where the fundamental spirit of the organization is targeted. In contrast, for an observer who believes that organization is like a machine, the

treatment will be similar to the repair of a machine.

However, Jaques' supporting voice shows that there is no need to repair the bureaucratic machine. The problem is that people do not understand how adequately to design and to use the bureaucratic machine. The diversified opinions manifest the ramified passages towards fixing belief. The ends of the passages are not consistent. On the one hand, we cannot deny that organization has mechanistic activities that are constituted by regulations and rules. However, we should notice that mechanistic ideas have been incorporated into the organic concept. (See Chapter3) This incorporation advances notions such as 'cybernetic' and 'goal-seeking'. The organic concept manifests the interdependence of organization components and this interdependence enables the viability of an organization. On the other hand, we should recognize that the most fundamental components of organization – people – have *will*. This idea suggests that the problems of organization, in some circumstances, cannot be ascribed to the animal's 'bone', 'organ' or 'meat'. Rather, they are attributed to the 'people's mind'. The review shows that we need both concepts to diagnose an organization, rather than relying on only one-dimensional perspective. Thus, we need a multiple views to reconcile the different ideas. This notion should enable us to diagnose organization within a more comprehensive picture.

Chapter 5 Multiple Views on Organization

'The feeling of commiseration is essential to man, that the feeling of shame is essential to man, that the feeling of modesty and complaisance is essential to man, and the feeling of goodness and evil is essential to man'.

- Mencius, 372BC~289BC.

'Differences of opinion are not due to difference in intelligence, but merely to the fact that we use different approaches and consider different things'.

- René Descartes, 1596AC ~ 1650AC

The purpose of this chapter is to propose a concept that integrates the reviewed philosophies about organization. We suggest that organization behaviour can be understood through three angles – structure, process and people. The multiple perspectives highlight that organization possesses miscellaneous features in which each perspective furnishes us with unique contribution to understand organization behaviour. The three dimensions should not be mutually independent. Indeed, they are interwoven. The development of the three ideas connotes human's quest of peering into the mystery of complex social system.

We have seen how the metaphor theory influences our approaches to designing organization and to tackling organization problems. The inadequacy of the mechanism theory inspires systems thinkers to move forward to explore unidentified properties of organization. In the organic world, organization consists of indispensable subsystems undertaking viable functions. The subsystems play the role of regulation at different nodes. They are the structure of organization.

But there are links among the functional subsystems. The links are the channels enabling 'change'. 'Changing' is the thrust of 'process'. Process manifests 'interrelation' of system elements, 'interaction' between system and its environment, and goal- seeking. In the earlier discussion in chapter 3.3.2.1, LST does not explicitly outline how the subsystems are related. The process between subsystems remains at hypothetical envisaging. It is a causal relation subject to people's arguments. The arguments delineate 'how we get things done'. Process is about how thing work.

However, the structure of organization is constituted of people, rather than constituted of other organisms or constituted of organs. People are different from organisms in an obvious way: people have 'purposeful mind', which includes ethic, value and norm. This axiom leads to the evolution of the other school of thought whose endeavor is to devise diversified approaches that can take human issue into account during the design. For example, Katz and Kahn (1966) postulate that the internalization of organizational goals is the most effective motive pattern to prompt an organization's functioning to high levels of effectiveness. Intrinsic motivation moves individuals towards the goals of the group because these represent their own personal values and self-concepts.

The ancient oriental wisdom, Confucian ideals, furnishes us with fruitful concepts on people perspective. Confucius urges us to tackle human interaction in a proper way. The urge is reflected in three Chinese characters: *Li*, *Zhong* and *Shu*. The illustrations of the three characters manifest that 'organized people' have certain features that cannot be explained by only organization structure. If we could not deal with human interaction in a proper way as the delineated three Chinese characters, we gradually lose viability. The argument manifests the appeal of 'ethic of knowledge' derived in chapter 2.5.

As a result, the interests of many prevailing social system theories focus on three perspectives: structural perspective, process perspective and people perspective. The *structural and process perspectives* focus on functions of an organization, such as Beer's VSM and Miller's LST. In contrast, the *people perspective* concerns human issues in organization, such as Ackoff's Purposeful System and the contemporary critical ideas reflected in Flood and Jackson's (1991) *Critical Systems Thinking*.

In fact, the multiples views are mutually complementary rather than competing. On the one hand, as Beer (1984, p. 13) argues, '... people also have constraints laid upon their variety by upbringing, or by the role that they agree to play in a social unit like a firm'. On the other hand, as Ackoff (1994) stresses, ' ... social systems are systems that have purpose of their own, are made of parts that have purpose of their own'. The purposeful system displays *will* (see Ackoff, 1972). An organization possesses both characteristics of

functional units and purposeful behaviour. The intangible mental activities, concrete structure of functional components and processes are interrelated. An organization should have cybernetic function to adapt to environment change to achieve its goals. But an organization can change its goals, even if the environment does not change. For example, an organization could change its goals from profit-oriented to staff-welfare- oriented, although the environment kept constant. It is just like a person's will, that could at one time aspire to becoming an artist and at another, an engineer, while the social environment remained constant throughout.

5.1 The Structural Perspective - Variable

The effort of structural perspective is to identify functional elements that are essential to achieve organization's goal. For instance, Simon (1976, p. 63) uses fire department as an example to illustrate how essential functions are decided through means-end analysis. A fire department has its purpose the reduction of fire loss. The means to the attainment of this end are the prevention of fires and the extinguishments of fire. The two principal means are often represented in the organization structure by a fire prevention bureau and the fire fighting forces respectively. Simon's argument can be further illustrated. In actuality, for example, the attainment of prevention fire can be attained by education, fire-resistance material etc. These means could be further extended to the next lower level hierarchy in organization structure.

Simon's approach is a rational procedure to derive essential functions for an organization to attain its goal. The derivation is mechanistic analysis. A hierarchical structure is established through this procedure. This idea is so alluring. As long as individual fulfil the assigned tasks, the whole will be perfectly functional. But, how is coordination among the functional departments? How does material flow among the functional departments to achieve organization's goal? Organization science does not rest. It continuously seeks different ideas to breakthrough this barriers. Accompanying the flourish of general system theory, the derivation of organization's essential functions is obtained through mapping onto life substance. In LST, organization structure is consisted of the 19 critical subsystems (functions), described in chapter 3.3.2.1. In VSM, organization structure is

consisted of 5 major subsystems (functions), delineated in chapter 3.3.2.2.

In the organic world, cybernetic notion dominates organization design. Organization is not perceived as mechanistic functions for goal achieving. Instead, the subsystems' functions are for self-regulating and goal seeking. Each node of organic structure interacts with relevant nodes for maintaining the whole at a desired state. Miller's (1978, p.103) hypothesis of living system's structural position delineates the notion of organic structure. The hypothesis reads: The position in a system is an arrangement which satisfies a joint function of: (a) the optimal location of nodes in a *distributors* and *nets*, (b) the location of *requisite inputs* for particular subsystems functions, and (c) the arrangement which will make for optimal spatial distribution of functions *serving all subsystems*. This hypothesis reflects how the subsystems interact with each other, and the interactions are like web structure.

In contrast, the function of a mechanistic node serves its connecting parts of a linear hierarchical structure. For instance, Downs (1966, p. 265) puts forward a hypothesis, which delineates the structural relationships of mechanistic elements. The hypothesis is: most bureaus contain a single formal hierarchy of authority responsible for coordinating behaviour, allocating resources, and carrying out communication functions. Downs' portray manifests that the function of a mechanistic node is to serve its nearest parts to execute the above-mentioned tasks, rather than serving all the subsystems.

Although the ideas of organic and mechanistic structures are different, their goals are quite similar. They both attempt to identify functional elements that serve organization's purposes. The elements are variables, which are suitable to scientific studies. They are fundamental parts of a model, which can demonstrate organization's behaviour. They are the indicators for examining whether an organization is at functional state.

5.2 The Process Perspective – Formula

The process perspective is about 'how we get things done'. It involves operation procedure, flows of material and information within an organization and so forth. Through identifying interrelationships among subsystems' variables, the process

perspective seeks to predict organization behaviour by a model. How the operation procedure is established and how does information flow within an organization hinges on the structure of the organization.

For example, Downs (1966, p. 270) states: the most common bureau response to communication overloads is slowing down the speed of handling message without changing communication network structure or transmission rule. However, for the same issue (information overload), Miller (1978, p. 123) finds several adjustment processes, from living system point of view, undertaken by organization. They include: *omission*, *error transmitting*, *queuing*, *filtering*, *abstracting* (processing a message with less than complete detail), *multiple channels*, *escaping* (acting to cut off information input), and *chunking* (transmitting meaningful information in organized 'chunks'). Obviously, the procedure of reacting on a circumstance from an organic view is more flexible (such as multiple channels and chunking) than mechanistic approach (simply slowing down the speed of handling message).

Although the mechanistic and living system procedure to react to a circumstance is different, both of their endeavours are to identify the relationships among the subsystem and variables. They attempt to discover the pattern of relationships that effect organization behaviour. Without such pattern, a model would not be complete. Consequently, organization behaviour is unable to be predicted. By discovering the formula, a model becomes alive. We can verify whether a theory is suitable or it still needs further elaboration and improvements.

SDM, introduced in chapter 3.3.2.4, exemplify the structural and process perspectives. By means of such scientific model, it is believed that organization phenomenon can be demonstrated. Based on the demonstration and observed facts, we can make adjustments in the process (formula) to refine our scientific model. The objective of refinements is to approach reality. As such, the elaborated model can help us to make decisions to intervene in organization problems.

Despite the links of subsystems (variables) are subject to certain coercive constrains, the

design of linking between subsystems is dependent on people's judgment. For instance, in terms of coercive constraint, we could not deny that information transmitting is constrained by the functions of a sender, channel and receiver. But how we layout the transmitting channel is a question subject to debate. We have already pointed out that LST does not explicitly outline how the subsystems are related. The question of linking, in some circumstances, could not exclude people's opinions. This question manifests that people issue and scientific method mutually interact. As Siu (1957, p. 71) stresses, 'science herself is not beyond the carrier of subjective pleasure'. In organization, human's subjective pleasures are part of the essential factors that profoundly effect organization behaviour. They are unobservable. This phenomenon forms the third perspective – people perspective.

5.3 Reflections on Functional Paradigm

By the above discussion, we can see that the structural and process perspectives are primarily underpinned by functionalist concept, though some 'subjective pleasure' (people perception) is embodied in the functionalist theory. The criticisms of mechanistic functionalist have been reviewed in chapter 4.1. Most criticisms attack mechanistic function from the angle of organic functionalist or humanity concept. However, some scholars challenge its foundation – quantitative model.

McCarthy (1978, p. 216) interprets Harbermas' criticism of the limitations of functionalist approach. He points out that the type of theory appropriate to such an object domain must include assumptions about empirical connections between social norms, connections that go beyond the subjective intentions of those acting under the norms. The significance for social life of the objective connections within the social role is latent. Its disclosure requires the discovery of the functions that specific elements fulfil in maintaining the continuity of the social system. As such (ibid, p. 219), it is dubious to suppose that the control values of a system are 'given' in the same way as the cultural values that determine social norms. ... In reality, parameters for the goal state of a social system cannot be ascertained in the same way as for the parametrically determined equilibrium state of organism. That is empirical value that can be ascertained for a given system along the dimensions designed cannot be related to an optimal value. Such control

values are not 'given'; at best they can be 'found' by way of political formation of will. But this would be possible only under the presupposition of a general and public discussion among members of the society.

Drechsler (2000, p. 246) argues that natural science deals with object, social ones with subjects, i.e., with human being. This basic difference has a decisive impact on the transferability of concepts from one to the other. For instance, in social ones, some factors might be very disturbing and not suitable for scientific studies, we just make these qualities disappear and disregard them. It is like 'that the colour of the leaves of a tree is green, so we disregard it, and at once they are colourless'. This one of the problems with counting: in the end, one could only count what is the same, but as things that are exactly the same are self-identical, there would be nothing to count. Drechsler's argument reflects that functionalistic modelling could not take some factors into account. This leads to the uncertainty of model.

Morgan (1986, p. 74) pinpoints three limitations that are relevant to functionalism. The three limitations are:

(1) We are led to view organization and its environment in a way that is far too concrete. We know that organism live in a natural world with material properties that determine the life and welfare of is inhabitants. .... But this image breaks down when applied to society and organization because organizations and their environments can, at least to some extent, be understood as socially constructed phenomenon. Organization are very much products of visions, ideas, norms and beliefs so that their shapes and structure is much more fragile and tentative than the material structure of organism.
(2) If we look at organisms in the natural world we find that they are characterized by a functional interdependence where every elements of the systems under normal circumstances works for all the other elements. .... If we look at most organizations, however, we find that the times at which their different elements operate with the degree of harmony discussed above are often more exceptional than normal. For most organization are not as functionally unified as organisms.
(3) The danger of the metaphor becomes an ideology. For example, the fact that

> organisms are functionally integrated can easily set the basis for the idea that organizations should be the same way. Taylor's scientific management provided an ideology based on the idea that 'efficiency and productivity is in the interests of all.' ideologies associated 'OD' tend to emphasize that we can live full and satisfying lives if we fulfil our personal needs. Many argue .... that people becomes resources to be developed, rather than human beings who are valued in themselves and who are encouraged to choose and shape their own future.

Cumulatively, the above criticisms show that functionalistic idea ignores human issue. However, as our discussion in chapter 2.5, regarding the usefulness and ethic of knowledge, practical relevance and creative contribution should be given attention. Functionalistic ideas should be given credit, at least, on several aspects. For instance, Morgan (1986, p. 72) indicates the strength of organic functionalist: using the image of an organism in constant exchange with the environment, we are encouraged to take an open and flexible view of organization. We can recognize that so long as key processes are functioning in an effective manner, everything may be going well. Jackson (see Flood and Jackson, 1991, p. 128) stresses that objective aspects of the social world should be given attention. If one ignores the objective aspects (coercive constraint) of the social world, one will be severely limited in terms of its effectiveness in bringing about change to social systems, and tend to work for change at the idea level.

As such, functionalism's contributions of capturing some indispensable aspects of the social world should be appreciated. For instance, it is difficult to deny that each organization strives to 'survive'. Each organization lives with 'input'. Although the required functions for each organization might be subject to debate, it is difficult to refute that organization requires various functions to fulfil the underlie purpose. While we are enjoying emancipating debate to surface human dimension problem, we should not forget there is a functional unit making preparations of debate for us.

5.4 People Perspective – No Formula

Siu (1957, p. vii) poses a question whether the scientific method, which has served man

well in his material advancement during the past three hundreds years, reached the point of diminishing effectiveness for humane progress? In turn, Siu reviews the effectiveness and limitations of scientific method. Although science speeds on an unabashed, it still contains fallacy in its nature. For instance, Siu reminds us to guard against the glib use of logic. In his review of logic, for example, he questions: in what way is the 'half' in half-a-pound similar to the 'half' in half-a-foot? Is there such a thing as half of a man, or half of a family? Siu's solicitation reminds us to reconsider whether science is adequate to deal with all problems.

At least, Birrer (1999, p. 811) criticizes that, in the technical framework, environmental problems easily get reduced to merely problems of science. The search for solutions becomes dominated by a technocratic perspective, as if technical solutions were the only possible way out. One of the thing that is technocratic framing tends to overlook is that many questions with respect to the environment simply cannot be answered by present day science. Chaos theory suggests that in some cases 'prediction' may even in principle be impossible to make. However, systems analysts were seen as somehow imposing their view on others, claiming unbridled universality for their framework, and leaving no room for anything to exist outside its scope. Birrer's criticism manifests that there is no room for different perceptions. Humanity is not given concern in the conventional science.

Siu suggests 'no knowledge', a level that differs to rational knowledge and intuitive knowledge, as the third thinking to pore over humanity issue (the unpredictable). It is oriental sage-knowledge. At this level, the sage forgets distinctions between things. He lives in the silence of what remains in the undifferentiable whole. Siu (ibid, p. 81) points out that scientific knowledge can be seen as 'positive method', whereas 'no knowledge' can be seen as 'negative method'. In the positive method, the item under question is intentionally pointed out and described. In the negative method, it is specifically not discussed. By not dissecting the ineffable x in question but merely restricting discourse to objects that it is not, the features of the x are revealed in our dim consciousness. Integrity and humility pervades the realm of 'no knowledge'. There is no question of fame, by-lines, titles, and honours. There is only 'participation'.

Siu's concern on humanity issue surfaces that we need a different treatment to this issue. The treatment should differ to scientific approach, on which functionalism flourishes. Siu's argument reveals while functionalism attempts to stretch its tentacle to every nook, it could not transcendent to a higher realm where dim consciousness is at a vantage point. Why scientific method becomes weak, while it enters into this realm? A number of scholars propose that human are different, so that we need different treatments (see chapter 4.2 about Abrahamsson, Ackoff and Pinchot's treatments). Human is different to object; for example, human have emotions. Although science could detect the symptoms of theses facts, she could not deeply probe into this realm. Variables and formula become faint while science attempts to plunge into the deep, deep human heart.

Here we intend to inject some oriental wisdom that helps us to understand why human are different that leads to difficulty to predict organization behaviour in terms of functionalism language. For example, the above words of Mencius (Mencius was a Chinese sage who succeeded Confucian thought.) shed light on the primary differences between human and object. There is a Chinese saying: 'Humans are with feet planted on the ground and head supporting the heavens, whereas animals are with back facing heaven to act'. This saying seems to talk about the exterior differences between human and inhuman objects. However, its objective is in fact to illuminate the inward difference between them. The different physical configuration means that human possesses some peculiar characters, given by God's creations, which are not given to the other beings. We strive to quest for establishing ethic values and norms, whereas inhuman objects do not possess such latent yearnings. The yearning differentiates people from objects. It manifest that people's perceptions play another crucial factors that effect organization behaviour.

Why the deepest and least accessible mental activities influence organization behaviour? The oriental wisdom furnishes us with some clues to comprehend the 'why' of this question. From the Confucian perspective, an organization's viability closely relates to humanity; i.e., whether people have been given attention and cared. In other word, each person should self-reflect whether he/she cares about people. Thus, 'internal observation' is prior to 'external observation'. In a sense, self-reflection is the first step. Then can one

start to deal with the external world affairs. This concept is illuminated in the first sentence of *Great Learning* (*circa*. 400BC), in which is written: 'The Way of the Great Learning is to enlighten immanent virtue; to renovate the people; and to rest in the highest excellence'. It reveals that Confucius' meditation of learning is to enlighten our innate virtue. Through the illumination of one's innate virtue, one is capable of being intimate with people and of renovating them towards good. From the above quotation we may grasp that the core concept of Confucianism relates closely to human issue. Confucianism urges us to undertake self-reflective about our deepest and inaccessible 'purpose'. There are three Chinese characters that can signify the urge of self-reflection. One is *Zhong (loyalty)* and the other is *Shu (magnanimity*). This is recorded in *Analects* IV/15: 'Tsang said, "The doctrine of the master is *Zhong* and *Shu.*"' Furthermore, along with *Li (decorum),* they shape the premise of survival of an organization. The construction of these characters can help us to understand their meaning.

A dialogue between Confucius and a duke illustrates *Zhong* and *Li*: 'The duke, Ting, asks how a lord should employ his ministers, and how ministers should serve their lord. Confucius replies: "A lord should employ his ministers according to *Li* (*decorum*); ministers should serve their lord with *Zhong* (*loyalty*)"' (*Confucius Analects*: III/19, ca. 400BC). *Li* in English is 'decorum'. The Chinese character of *Li* is shown in Figure 5-1. The left part of the character is a radical , which indicates the presence of the spirit during the sacrificial offering. The top right symbolizes a container filled with offerings to revere God. The bottom right of the character is a bean that grows in northern China. When the bean is ripe, its shape is like a curve. *Li (decorum)* delineates the ancient lord, who reveres God in formal dress, holding a container in hand, and his posture is as the curved bean which expresses sincerity and reverence. In the Confucius ideal, the superior should treat the subordinate with reverence, instead of giving 'top-down' instructions, and should provide opportunities for him. *Vice versa*, the minister serves his lord with *Zhong*. *Zhong* in English is 'loyalty'. The Chinese character of *Zhong* is shown in Figure 5-2. The upper portion of the character means middle, which implies 'unbiased'. The bottom of the character means mind. Therefore, *Zhong (loyalty)* connotes *unbiased mind*, which implies *unselfish purpose*. If one interprets *Zhong* as 'obedience', then it is a distortion. The Confucian ideal proposes *unselfishness* as the premise to guide one's conduct. A

Figure 5-1: The Chinese Character of Decorum

The left part of the character means cloth and signifies formal dress.
The top right symbolizes a container filled with offerings to revere God.
The bottom right of the character is a bean

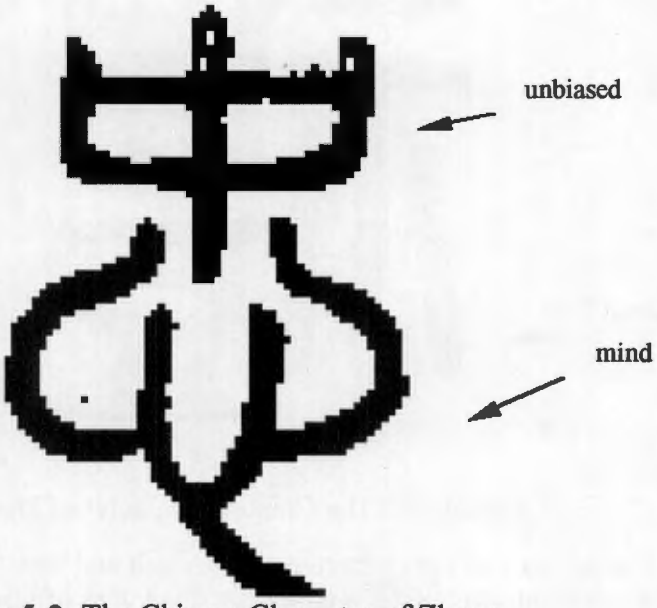


Figure 5-2: The Chinese Character of Zhong

The upper portion of the character means middle, which implies 'unbiased'.
The bottom of the character means mind.
Zhong connotes ***unbiased mind***

history book corroborates this: 'A man with *Zhong* is unselfish' (*Tzuoo-Juann* (*A Commentary on the Spring and Autumn Annals*, authored by Tso Chiu-Ming), *circa* 500 BC?).The character *Shu* signifies the core concept of Confucian organization culture. The Chinese character of *Shu is* shown in Figure 5-3. The top portion of *Shu* means 'as if' and the lower part is 'mind'. *Shu* implies 'reciprocity', i.e. to reciprocate another's feeling of mind as if it were one's own. In certain senses it means that one should not treat others in a way which one does not like others treating oneself; and one should treat others in a way that one hopes others will treat oneself. 'Tsze-kung (a disciple of Confucius) asks: "Is there one word which may serve as a rule of practice for all one's life?" The master said: "Is not *Shu* such a word? What you do not want done to yourself, do not do to others"' (*Confucius Analects*: XV/14). *Shu* implies that self- reflection before action promotes benevolence. Both *Zhong* and *Shu* are rooted in 'mind'. If an organization lacks *Zhong*, we might find problems like corruption, fraud, lack of work ethic, nepotism and so forth. If an organization lacks *Li*, we might find problems like coercive management style and ignorance of a subordinate's need. If an organization lacks *Shu*, we might find the problems like insincerity, lip service, lack of trust and so forth. Deviation from these three implies that 'value', 'norm' and 'belief' are not given attention and properly dealt with. They could result in problems, of which sources are in the deepest human heart, that functionalism paradigm is difficult to model and predict.

The Confucian ideal provides for humanistic perspective to manage organizations. The concept is also stressed by contemporary philosophers like Churchman (1970; see Chapter 1). Obviously, the two chief foundations of science - logic and empirical observation - are not sufficient to deal with all circumstances. Again we could cite the question of an earlier chapter: Shouldn't we ignore a red light when we are carrying a heart-attack patient in our private car? Under such situation, 'rational decision' will not help the heart attack patient. Therefore, human's perception should not be ignored. However, science often excludes these disturbing issues from consideration. At the end, we have to bear the consequence of ignoring them.

Inasmuch as people's *perception* and *will* are vital, is it governed by natural law as determinism proposes? In other words, is human action caused? As long as we have

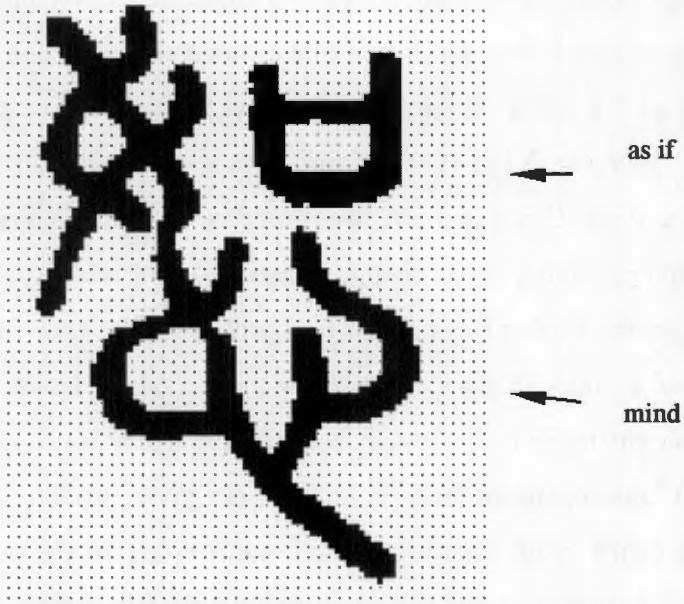


Figure 5-3: The Chinese Character of Shu

The top portion of *Shu* means 'as if'.
The lower part means mind.
Shu implies 'reciprocity',
i.e. to reciprocate another's feeling of mind as if it were one's own.

sufficient knowledge of natural law and certain data of present events, we can infer forward and backward events. And make precise predictions of people actions, which are presented in well-structured formula or perfect derivation. In this regard, Russell (1914, p. 236) advises us that 'we cannot therefore, feel any a priori certainly that causation must apply to human volitions. ... I think, entirely from the assimilation of causes to volitions, and from the notion that causes compel their effects in some sense analogous to that in which a human authority can compel a man to do what he would rather not do. This assimilation, as soon as the true nature of scientific causal laws is realized, is seem to be a sheer mistake'. In certain senses, via empirical laws, perhaps we may infer a man's succeeding actions according to present events. But, the inference is neither certainly true nor precise.

Correspondingly, Mitroff & Linstone (1993, p. 103) stress personal perspectives are equally significant. They are often the most subtle, the most elusive, and the most difficult to specify. Here the world is seen through the eyes and the brains of particular individuals. Intuition. Charisma, leadership, and self-interests play vital roles in matters of policy and decision and can only be understood through the personal perspective. .... A human being's own personal perspective is of course itself a product of genetic and environmental influence. There is 'no formula', no assurance of balance. Mitroff and Linstones' arguments reflect the intangible nature of people's perspective. Consequently, the natural science's pursuing encounters obstacles while a quantitative model has to be formulated for people's different interests and views. People's perspective shakes the foundation of conventional scientific method.

5.5 Reflections on People Perspective

Although people perspective is indispensable to understanding of organization phenomena, it does not exhaust the whole picture of organization. Functionalism provides some important views of organization also. In chapter 5.3 we have illustrated that there are some coercive constraints on organization. They are unshakable facts irrelevant how people perceive them. It is not helpful to be evasive about these facts. As a consequence, people perspective could not explain every situation. In this passage, more weakness of people perspective is reviewed.

We have defined organization in chapter 3.1. According to the definition, organization is constituted by people and resources (substance). In some circumstances, the dysfunction of organization should not be ascribed to people's view and interests. For instance, hardware of telecommunication malfunction should not be ascribed to people's value and norm, provided relevant stakeholders pre-agree with the design. In a sense, if people perspective becomes an ideology, we could be used to condemn people on every type of dysfunctions. Morgan (1986, p. 197, 318) questions the concept that explain organization phenomena simply in terms of interests, conflicts, power political activities and domination:

(1) When we analyse organizations in terms of political metaphor it is always almost possible to see signs of political activity, confirming the relevance of the metaphor. However, this mode of understanding often leads to an increased politicisation of the organization. ... There is a very real danger that its use may generate cynicism and mistrust in situation where there were none before.
(2) The applications of pluralism are merely superficial. Is it realistic to pressure a plurality of interests and plurality of power holders, or are more radical organization theorists correct in seeing fundamental class antagonism between structure on interests and power? .... A strong case can be made for the idea that the interests of individuals or small coalitions may best be served if they recognize affinities of a 'class' kind and act in a unified manner.
(3) To the extent that domination is seen as part of social conspiracy or the responsibility of a few individuals, the latent consequence is to assign blame, arouse defences, and entrench the fundamental problems. At best, it mobilizes social and political opposition to the problem, aiming for revolutionary change but usually achieving no more than marginal change.

Mogan's review reflects that people perspectives could lead us to fall into anti-positivists' cave where we keep on apologizing our subjective views (see chapter 2.5 about Wick and Freeman's argument of anti-positivist ideas). In the end, whatever malfunction in an organization are attributed to people. This perspective entails us to always seek solutions

to a problem through people's subjective arguments. But, could inter-subjectivity ultimately surface reality?

The Taoist Chung-Tzu, who lived in the third century before Christ, put the dilemma thus: He once dreamt that he was a butterfly fluttering among the flowers. Suddenly he awoke. Was he a man who had dreamt that he was a butterfly or was he a butterfly who was then dreaming that he was a man? The American philosopher Charles S. Peirce puts forward similar dilemma. He says: 'One singular self-deception...which often occurs, is to mistake the sensations produced by our own unclearness of thought for a character of the object we are thinking. Instead of perceiving that the obscurity is purely subjective, we fancy that we contemplate a quality of the object which is essentially mysterious...' Chung-Tzu's aphorism and Peirce's arguments reveals that our subjective fancies sometimes lead us to believe unrealistic envisage.

As such, people perspective is a subjective issue. It does not ensure that the reality could be surfaced through emancipating debate. However, it should be concerned because we could not escape from it. In some circumstances, the subjective obstacles are bigger than objective barriers.

5.6 The Multiple Views –Triadic Linkage

Cumulatively, the thesis deduces triadic perspectives to understand organization phenomenology. The triadic perspectives - structural, process and people perspectives – form an interlinked and irreducible notion for understanding organization behaviour. The structural perspective embodies functionalistic paradigm. From Weber's bureaucracy theory to general system theory, organization structure progressively evolves to a more flexible organic pattern. In the organic world, organization has brain (decision-maker), intelligence collection (market survey), a digestive system (transforming raw material to product), a nervous system (network or telephone line) and so forth. LST provides a paradigm for conceptualizing organization structure as a living system. Within the living system structure, information is transmitted and material is processed. These subsystems have been interpreted in Table 3-1.

From structural perspective, many variables can be measured for checking whether an organism or an organization is at steady state. For example, Miller (1978) points out that the variables that measure the process of *channel and net* include distortion of the channel and net, signal-to-noise ratio in the channel and net, rate of processing information over channel and net and so forth. Likewise, in Swanson and Miller's (1989) theory of Conceiving Accounting as a Living System, they propose the variables of bills, checks, electronic funds transfers, reports and so on for measuring the state of a *channel and net.*

The objective of this research is not concerned with measuring variables to monitor organization's state. In some circumstances, the measured variables cannot reflect the root problems of a system. For example, the figure displayed on a blood pressure gauge cannot reveal whether high blood pressure is caused by excessive fat accumulated in the veins, thick blood, or a stressed mood. Our primary interest is to seek the causal relationships of the problematical elements of organization. More detailed illustrations of causal relation will be discussed in the later sections.

Pidd's (1996, p. 135) depicts the concept of structure of the situation (in terms of Peter Checklan'd Soft System Methodology). He says 'this refers to the relatively static aspects, such as physical layout, official and unofficial power hierarchies, communications systems (whether formal or informal) ..... Structural ideas do not tell the whole story, but they can be useful'. Pidd borrows the idea of number assigned to each football player as an example to demonstrate structural concept. The numbers more or less indicate their playing positions. Pidd's illustration reflects that numerous nodes constitute the structure of a situation. They are the regulating points. They are not dynamic unless process occurs.

The second perspective, process perspective, is how things get done. It is about interrelationships of variables. 'Formula' is the aim of this perspective. It concerns how material and information change within the connecting bond. Pidd (1996, p. 135) interprets the meaning of process of a situation by 'In addition to the structure, we need to understand how things are done and what people are trying to do'. In the football game, this corresponds to the ways in which the game is actually played and the role that people actually occupied. As such, process makes a system alive. It induces dynamic behaviour

of a system.

The third perspective, people perspective, is about people's feeling. The feeling is beyond the scope that scientific method intends to penetrate into. Mitroff and Linstone (1993, p. 104) borrow R.G.H. Siu's idea to illustrate the adequate scope of scientific method. They stress rationality and scientific method provides critical inputs to only one of three critical questions that overarch key decisions. These are: (a) does it add up? (b) does it sound O.K. and (c) does it feel right? Logic and science contribute primarily to the first questions, less to the second and even less to the third. Pidd (1996, p. 136) holds similar opinions. Pidd borrows Peter Checkland's term 'climate of the situation' to denote people perspective. Pidd points out the climate of the situation is how does the situation 'feel'? Is it exciting or rather boring? How do people value what they do? Science encounters difficulties while she intends to observe certain invisible feelings. The aim of this perspective is to surface invisible mental yearning or perceptions. But how doe we surface it? Chapter 4.2 introduces several scholars' solicitations to deal with this issue through 'interaction', 'dialogue' and 'participation'.

The three perspectives are equally fundamental and interwoven to form an interdependent whole for understanding organization. The structural perspective, as illustrated in chapter 3 (metaphor theory) and the earlier sections, adjoin people's subjective pleasure (people perspective). It is more or less associated with the observer's conceptualization even though it embodies certain invariant facts. But, conversely, people perspective is sometimes influenced by structural perspective. For instance, while we are so used to mechanistic bureaucracy, our values and norms are often imbued with rigid rules and regulations. If rules and regulations could not cope with contingent situation, expecting for the superiors' instructions is a common situation. Obedience and then apportion of faults sometimes become people's norm.

The process perspective is associated with structural perspective. If the structure is a mechanistic node, the procedure to get thing done usually follows a hierarchical order. If the structure is like organic, there are interrelated linkage among the nodes for feedback and regulation. However, the layouts of linkages are very dependent to the designer's

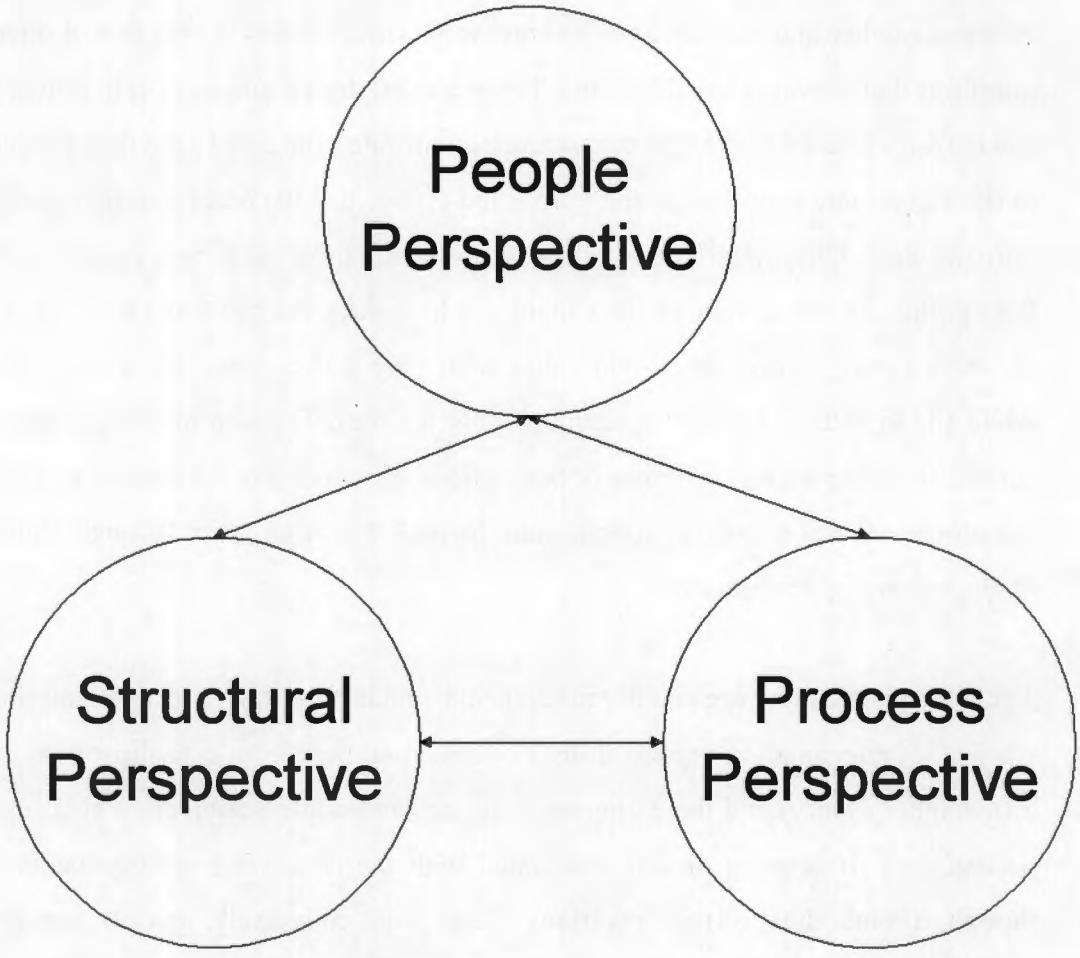


Figure 5-4: Multiple Views on Organization

view. There are no fixed principles to guide a design. While the designed process could not meet desired output, it can evoke people to change their views and consequently change the layout of structure.

Figure 5-4 delineates how the three perspectives mutually influence and interweave. The pictorial descriptions suggest a multiple views to understand organization phenomena. It also suggests that pathology (dysfunction) of an organization could be ascribed to any one of the three dimensions or part of the dimensions. Grounded in this idea, the next chapter attempts to put forward a general pathological pattern of bureaucratic organization.

Chapter 6 The Pathological Pattern of Bureaucracy

This chapter attempts to probe the pathological patterns of bureaucratic organizations. The exploration borrows LST, instead of VSM, as a basis for probing organization's functional problems. The reason is that we are interested in knowing whether or not the matter-energy processing subsystems can cause significant influence on organization's health. However, VSM does not provide a description of matter-energy processing subsystems that is as detailed as LST. In VSM, the matter-energy processing subsystems are categorized into System 1, operational subsystems, which does not show how many essential subsystems there are in System 1. In contrast, LST provides a more detailed description of matter-energy processing subsystems. The more detailed classification can help this research to explore whether or not they significantly cause organization pathology. (In a later chapter, we will explain how to apply the process of categorization of Interactive Management to explore whether it is the matter-energy processing subsystems that cause the considerable problems of a bureaucratic organization.)

Grounded in LST and past empirical studies – such as Ruscoe *et al* (1982, 1985), Merker and Lusher (1987), Bryant *et al* (1987) - on LST, we speculate that the information-processing subsystems are the primary sources of pathology in terms of organization function. However, when 'mental pathology' is involved, the situation is more complex. We suggest that mental problems and information subsystem problems can mutually aggravate, and directly or indirectly aggravate the state of matter-energy processing subsystems and the state of the whole. If the sources of pathology are the information-processing subsystems, the remedy actions are to improve the functional components of information-processing subsystems so that information processing is more efficient. However, if the source of pathology is human's feeling, belief or value, the situation is more complex. The remedy actions are to smooth human's aggrieved psychology.

Pathology is defined as 'any abnormal variation from a sound or proper condition' (see

Webster's New World Dictionary, Prentice-Hall, 1994). In the older sense, pathology pertains to human emotion, feeling and mind. For example, Kant in *Foundations of the Metaphysics of Morals* differentiates between pathological love and practical love. Pathological love is 'love as feeling'. In contrast, practical love is 'love in action'. Jeremy Bentham (see Burns and Hart, 1996) coins the term 'mental pathology' to denote the connection between the feelings of the parties concerned and the several classes of incidents which are produced by the operation of human emotion, such as pleasure and pain. However, the present-day sense of pathology is associated with disease. Scott (1997, p. 825) provides an interpretation that contains the older sense of pathology and the present-day sense of pathology. Scott coins the term 'inadvertent pathology' to represent 'those that are not deliberate'. In some ways, its origination is independent of human mind since it is not deliberate. The pathology referring to organization functions in this research corresponds with this type of pathology. On the other hand, Scott coins the term 'advertent pathology' to denote that the human operator is 'deliberately pathological' in some ways. These may be acts of sabotage or subversion within an organization or they may be Machiavellian political manoeuvers in the pursuit of power. The second type of pathology referred to in this research – mental pathology – corresponds with advertent pathology.

Thus, we may say that the proper condition of a system implies proper concrete system variables, interrelations and proper mind condition (or proper mental condition). The 'proper concrete system variables' and interrelations means the system's measurable variables are steadily interacting and within a desirable range. The 'proper mental condition', which is regarded as an unfathomable condition, means that people's feelings are at harmony state. For example, regarding the condition of concrete system variables, high blood pressure is an unsteady system variable at organism level. At organization level, excessive material flow in the production line is similar to high blood pressure. A psychopathological personality is an example of the second type of pathology, i.e., improper mental condition. However, it is not confined to mental disorder. The other mental conditions - such as stress, immoral intention, power domination, and conflicting perceptions - can also be regarded as pathologies, because they can lead to a system deviating from a proper condition.

The structural and process perspectives, underpinned by the organism metaphor, is more interested in the condition of observable variables and the relationships of variables, such as the amount of information transmitted within the system and the time required to process information. The people perspective, underpinned by the social system metaphor, is more interested in surfacing human mental activities and appreciation behaviour. The three perspectives should be seen as complementing each other. Each perspective captures part of the features of organization. Each perspective can explain organization behaviour to a certain extent. As Scott argues, both of the concepts (advertent and inadvertent pathology) may explain organization pathology. This chapter attempts to probe the influence of both types of pathologies on organization behaviour. The exploration of the structural aspect is underpinned by LST. The exploration of the mental aspect is underpinned by the concept of the social system metaphor.

6.1 Matter-Energy Processing Subsystems

As discussed in the earlier chapters, organization structure is an indispensable part of understanding organization performance. Based on Miller's (1978) LST, the organization's functions has three categories – the subsystems processing matter-energy, the subsystems processing information and the subsystems processing both. The matter-energy processing subsystems ingest negentropy materials and process the materials in order to maintain the survival of the system. They are the energy producer and transformer. The malfunction of these subsystems can immediately lead to a system's perishing. For example, at organism level, the dysfunction of *ingestor* could entail the system's inability to ingest food. The dysfunction of *producer* could cause the system to be unable to produce products to supply the needs of some subsystems or suprasystems. Consequently, owing to the lack of energy input, the system's variables, such as the sugar density of the blood, could not be maintained at desirable state. At organization level, the dysfunction of these subsystems implies the decreasing of manufacturing or producing. It can lead the system to approach 'equilibrium' state. Thus, the dysfunction of matter-energy subsystems can directly entail perishing. The matter-energy processing subsystems can be the sources of pathology.

In order to restore the system to desirable state, we have to repair the dysfunctional matter-energy processing subsystems. The repair can be fulfilled by replacing the damaged parts or by different degrees of rectification. At organization level, the matter-energy processing subsystems are replaceable. No evidence has been put forward that any matter-energy processing subsystem is not replaceable. In a sense, we can always seek new matter-energy processing subsystems to replace the paralyzed ones. There is no reason that the building cannot be rebuilt. There is no reason that we cannot purchase new equipments to replace the old or outdated machines. Therefore, matter-energy processing subsystems can be continuously replaced by new ones. The *a-priori* of whether we are able to replace them is dependent on the 'money' available. Money has a dual role – information and commodity. Swanson *et al* (1997, p. 51) argue that money is both information and commodity. We can convert or exchange money for commodity. As such, it is commodity. On the other hand, money carries value (information) that can be spent on exchanging commodity. As such, money is information. Thus, money links the conceptual level concept of value to the empirical level concrete commodity. Swanson's arguments suggest that the operation of physical matter (matter-energy) hinges on sufficient information (money) processed by information-processing subsystems.

Therefore, based on Swanson's arguments, the malfunction of matter-energy processing subsystems is not always ascribed to themselves. According to the systemic view, the subsystems of a system are interdependent. The matter-energy processing subsystems are linked to information-processing subsystems. In a sense, the normal operation of matter-energy processing subsystems is very dependent on correctly and precisely transmitted information (for example, money). This notion suggests that the efficient and accurate processing of matter-energy hinges on the efficient and precise processing of information. As Ruscoe (1982, p. 206) points out, it is less definitive that more effective battalion units tend to be more efficient in the processing of matter energy. Ruscoe says while matter-energy – the 'beans and bullets' of the battalion – is obviously important to battalion operation, the processing of matter-energy hinges on the efficient processing of information. In turn, Ruscoe borrows a former army officer's words to explicate this notion: 'Information drives matter-energy'. Therefore, the obstruction of, or the impeding of, or incorrect, information transmitting can critically cause the matter-energy

processing subsystems to be unable to operate normally. For instance, an incorrect decision made by the decider can cause the matter-energy processing subsystems to process material too slowly or too fast and this could subsequently entail excessive or insufficient material being stored in the matter-energy storage subsystems. The block of channel and net might cause the request for material from the operation unit to fail to transmit. Hence, in some circumstances, the abnormal signal is reflected in matter-energy processing subsystems; however, the remedy actions should focus on information-processing subsystems.

But in some circumstances the causes of the malfunction of matter-energy processing subsystems are due to human psychological activities. For example, a coercive leadership style, which has shaped the organization culture, may eventually provoke the operational staff members to be reluctant to process the material on time, i.e. strike, and further provoke a great amount of material to be accumulated in the factory. The illustration suggests that significant root causes of matter-energy processing problems do not lie in matter-energy processing subsystems. The primary causes should be ascribed to information-processing problems or people's feelings (people perspective). Figure 6-1 shows that the problems of matter-energy processing subsystems are predominantly aggravated by the other subsystems. The abbreviation of each subsystem in Figure 6-1 corresponds with Table 3-1. In the next section, we will discuss how information-processing subsystems significantly aggravate organization performance.

6.2 Information Processing Subsystems

The critical subsystems of information-processing subsystems were introduced in Chapter 3. At organization level, the decision-makers are similar to the brain of an organism. The communication channels are similar to the spinal cord and nervous system of an organism. However, we have to notice a disparity between the information-processing subsystems of organization and organism. The disparity is that the organization's information-processing subsystems can be replaced by new parts, whereas certain organism's information-processing subsystems still cannot be replaced by new ones. For instance, we are still unable to replace a human brain and spinal cord. However,

we are able to replace the brain of a firm (e.g., through head-hunting new decision-makers). Or, we can replace the outdated computer, network or telephone line. Hence, the information-processing subsystems of organization, like matter-energy processing subsystems, are all repairable. The deterioration of the information-processing subsystems cannot entail unsolvable problems because we are able to seek new parts to replace them.

Inasmuch as the information-processing subsystems are repairable, the causes of unsatisfactory performance could be ascribed to 'low efficient', 'incorrect design' and so forth. A number of researches have been undertaken to explore the pathology of bureaucratic organizations. In Chapter 4, we discussed the survey conducted by Ruscoe *et al* (1982, 1985). The research found that the more effective battalion tended to spend more time processing information. Furthermore, they also tended to be efficient in processing information. Part of the tentative conclusions and hypotheses are as follows:

(1) The greater the unit personnel's appreciation of and skills in information- processing, the greater the effectiveness of the unit;
(2) The more efficiently accomplished are the variables affecting the information-processing within the unit, the greater the unit effectiveness;
(3) The more time the company commanders spend monitoring and developing information to create action in a unit, the more effective the unit.

The tentative conclusions reveal the importance of information-processing subsystems in the organization's effectiveness. Besides, as Ruscoe points out, no evidence shows that the efficient processing of matter-energy has correlation with organization effectiveness.

Subsequently, Meker and Lusher (1987) undertook research in a hospital context. The research findings showed that the process performance index of the process was significantly higher for the high-effectiveness group for many of the information processes. Similarly the ranking of the information process tended to be higher for the 'high' group ('High' group means high-effectiveness group). It suggested that the emphasis on information processes, regardless of whether the perspective was time spent,

importance, or performance, was greater for the 'high' group. Bryant *et al* (1987) also had a similar result in their research on a public transit system. The result showed that the departments with higher levels of effectiveness perceived seven of the nine information processes as being done significantly better.

Simon (1976, p. 154) emphasizes the importance of communication, which is an essential function of information processing subsystems. Simon believes if there is no communication, there can be no organization. For, there is no possibility then of the group influencing the behaviour of the individual. Besides, the possibility of permitting a particular individual to make a particular decision will often hinges on whether there can be transmitted to him the information he will need to make a wise decision. And whether, in turn, will be able to transmit his decision to other members of the organization whose behaviour it is supposed to influence. Simon's arguments reveal information processing subsystems is critical to the performance of an organization.

On the other hand, for Scott (1997), if the elimination or minimizing of inadvertent pathologies of 'communication' is carried out, then it will also be the case that there will be an 'increased probability' that other forms of pathology are detected and may need to be eliminated or minimized. Scott verified his argument with research conducted in Britain. The research result shows that communication, which is a part of the information-processing subsystem, is the primary source of 'inadvertent' pathology.

The above body of research reveals that information-processing subsystems significantly influence an organization's health. In some ways, the causes of an unhealthy organization are primarily attributed to inefficient information processing. However, the above empirical observation could not draw conclusions as to what information- processing subsystems deterministically cause organization pathology. The reason is that the conclusions might differ from organization to organization. In one organization, the *associator* might be the most significant component to cause pathology. In contrast, another organization might perceive *decider* as the most significant component to cause pathology. Figure 6-1 shows that the activities of information-processing subsystems primarily aggravate the other subsystems.

6.3 On Intangible Mental Pathology

In Chapters 4 and 5 we discussed the influence of human perception on organization behaviour. Human perception is an unobservable and intangible mental activity. It is like the soul of an organization. It can independently influence organization behaviour, just as our minds can influence our behaviour. For example, the reason that we prefer yellow or green to the colour red, is not because we have different eyes. Our upbringing process or other factors may induce our preferences. The reason that some people commit crime is not that they have different human bodies. Rather, it is just a decision made in their minds. The mind cannot be fathomed, but it does exist and it does affect organization behaviour. As we will discuss in Chapter 7, one of the factors that contributes to organization complexity is that 'we do not know what people are thinking'. 'What people are thinking' is not merely about people's perception. It also relates to other psychological activities, such as Morgan's (1986) illustration of 'organization as an instrument of dominance' or Scott's term of 'advertent pathology'. It is deliberate actions that originate in human mind. For example, for some managers, 'power' and 'domination' are the most efficient tools to achieve objectives. In fact, these managers' 'mental activities' could cause rebellion of the shop floor staff. As the Chinese saying goes: 'Water can carry a boat or overturn a boat'. The rebellion of the shop floor staff could overturn an organization. Hence, certain problems of organization are not caused by inadequate organization function. Rather, they can more likely be ascribed to intangible mental activities, such as perception, value and confidence. (The failure of an organization, in some circumstances, is ascribed to lack of confidence, rather than inadequate organization structure.) As Arnold and Feldman (1986) mention, organization performance can be understood in terms of individual behaviours in which motivations, perception and personality are closely related to human mind.

Therefore, human perception is an essential component, which influences organization behaviour. Our appreciation activities, such as values and norms, significantly affect the way that we deal with an issue. Allison (1969) uses the term 'organization process' to connote such mental activities. Allison's views of 'organization process' and 'bureaucratic politic' are closely related to human mind. They manifest that human is not merely a cybernetic machine, but human has intangible mental activities that

considerably influence organization behaviour. Likewise, Linstone (1984) stresses that policy-making in some circumstances can be understood only in terms of personal perspective, i.e., leadership, interest, intuition or cognition. Linstone points out that much policy-making can be understood only through this partially rational explanation of the 'irrational' behaviour of the 'personal and group constitute'. Linstone's emphasis manifests that individual view profoundly influences the way that we tackle a real world problem. It implicitly indicates that mental activity can deeply affect organization behaviour. In other words, the pathology of an organization, in some circumstances, is ascribed to intangible human mind. It suggests that even if we can construct a brilliant organization structure, it can fail, owing to the undesirable state of people's minds. It is like suddenly- increased blood pressure, owing to bad temper, that may eventually lead us to suffer a stroke with paralysis. Figure 6-1 shows that mental activities (perception) can cause the dysfunction of information-processing subsystems and matter-energy processing subsystems.

6.4 A Systemic View on The Pathology of Bureaucratic Organization

Through the above discussion, we can see that organization pathology can be caused by various factors. It can be viewed from two primary parts: functional (including structure and process) and people perspective. The people perspective is more interested in human mind and is interested in surfacing people's mental activities. The objectives here are gradually to form 'consensus' on a problem. Democracy takes precedence over intervention through a well-structured model to make predictions of the functional departments' state. In contrast, the functional doctrine, that regards organization as a cybernetic machine, is more interested in resolving problems through amending organization structures and process on the basis of well-structured concept. In such notion, certain disturbing factors, such as 'corruption', are eliminated to for the convenience of quantitative analysis. Indeed, as it was shown in Chapter 5, organization is consisted of multiple attributes. The notion reflects that both mental and functional pathology could lead to an abnormal state. They mutually influence and they are inseparable.

The systemic view postulates that the parts of a system are interdependent. This notion hints that in an abnormal situation the problematical parts are also interdependent. In other words, it is possible to seek the interdependent relationships of problematical components. The early section of this chapter has discussed that the matter-energy processing subsystems would not cause significant impact on the system performance unless they were paralyzed. However, the paralyzed parts are all replaceable. The other possible situation that causes dysfunction of matter-energy processing subsystems is the failure of information processing or psychological state. The two factors could mutually influence. Both of them could be the sources of a problem. For example, the earthquake on 21 September, 1999, in Taiwan exemplified how the failure of information-processing subsystems influenced people's psychology. The 7.3 Richter scale earthquake knocked down a great number of buildings, networks and telephone lines. It caused power failures over a large area. The outlying suburbs and villages could not receive up-to-date information about the government rescue actions and the proposed subsidization of the civilians of the disaster area for the rebuilding of houses and the arranging of alternative accommodation. Subsequently, it led to psychological dissatisfaction with the government's capacity to deal with calamity. In turn, it provoked considerable chaos. Consequently, one of the governments' tasks during the calamity was to clarify rumours and to smooth people's aggrieved mood. This example shows how the failure of information-processing subsystems causes the psychological unsteady state of an organization.

However, the aggravating relation between information-processing subsystems and mental activity can be reversed; i.e., mental activity can cause the malfunction of information-processing subsystems. For example, an inappropriate leadership style can cause the subordinates to be unwilling to communicate with the superiors. It can further lead to the lack of express and precise information being transmitted within the organization upon which the leader would normally rely to make decisions. Hence, mental pathology can also entail an unsteady state of an organization. On the other hand, people's different views can also cause pathology. It is like choosing a car for a family. Sometimes the different colour preferences can cause tension in a family.

Inasmuch as unobservable human perception and concrete function can considerably influence organization behaviour, the relation between human perception and organization structure is an interesting topic for exploration. Thus far, we can see that the causes of pathology in a bureaucratic organization are likely to be mainly ascribed to information- processing subsystems or human mental activity. Figure 6-1 depicts the causal relations of aggravation between the subsystems that belong to the functional aspect, and the subsystems that belong to the mental aspect. We can see that the mental components and information-processing elements could mutually aggravate, as well as aggravate matter-energy processing subsystems. In contrast, the matter-energy processing subsystems are primarily aggravated by the other two subsystems or by themselves. But we maintain that if the mental activities are the primary sources of pathology, more work has to be undertaken to deal with the mental conflicts between humans or groups. For instance, if the telephone wire's dysfunction is due to electrical hardware problem, it is a matter of replacing the damaged part. If it is political problem, the situation is injected in mystery.

Figure 6-1 is not a conclusive depiction of the aggravating relation of the organization's subsystems. Rather, it is an incentive that leads us to verify what critical subsystems significantly influence the health of an organization. This research attempts to bridge the idea of functionalism and humanism, to verify the speculations and to discover the influential components. Our ideas are that the intervention approach should take both human mental activities and organization function into account. While we interact with the members of an organization, the process should be able progressively to surface the function problems and the mind problems. Why do we intend to surface mental pathology and functional pathology through interaction with the organization members? The next chapter attempts to probe the nature of complex problems. The illustration shows that both complexity and problems are differently interpreted by each person. Thus, interaction with the members is an appropriate way to help us to grasp a bigger picture of the complex problems of an organization. The arguments in chapter 7 serve as a base for establishing the rules of actions, which help us to depart from perplexity and to practically deal with the research questions. The discussions are meant for settling belief, which pertains to action. Peirce calls the belief 'practical belief'. As was discussed in chapter 2.4, useful knowledge should enable us to practically deal with management problems and expect the consequences of actions.

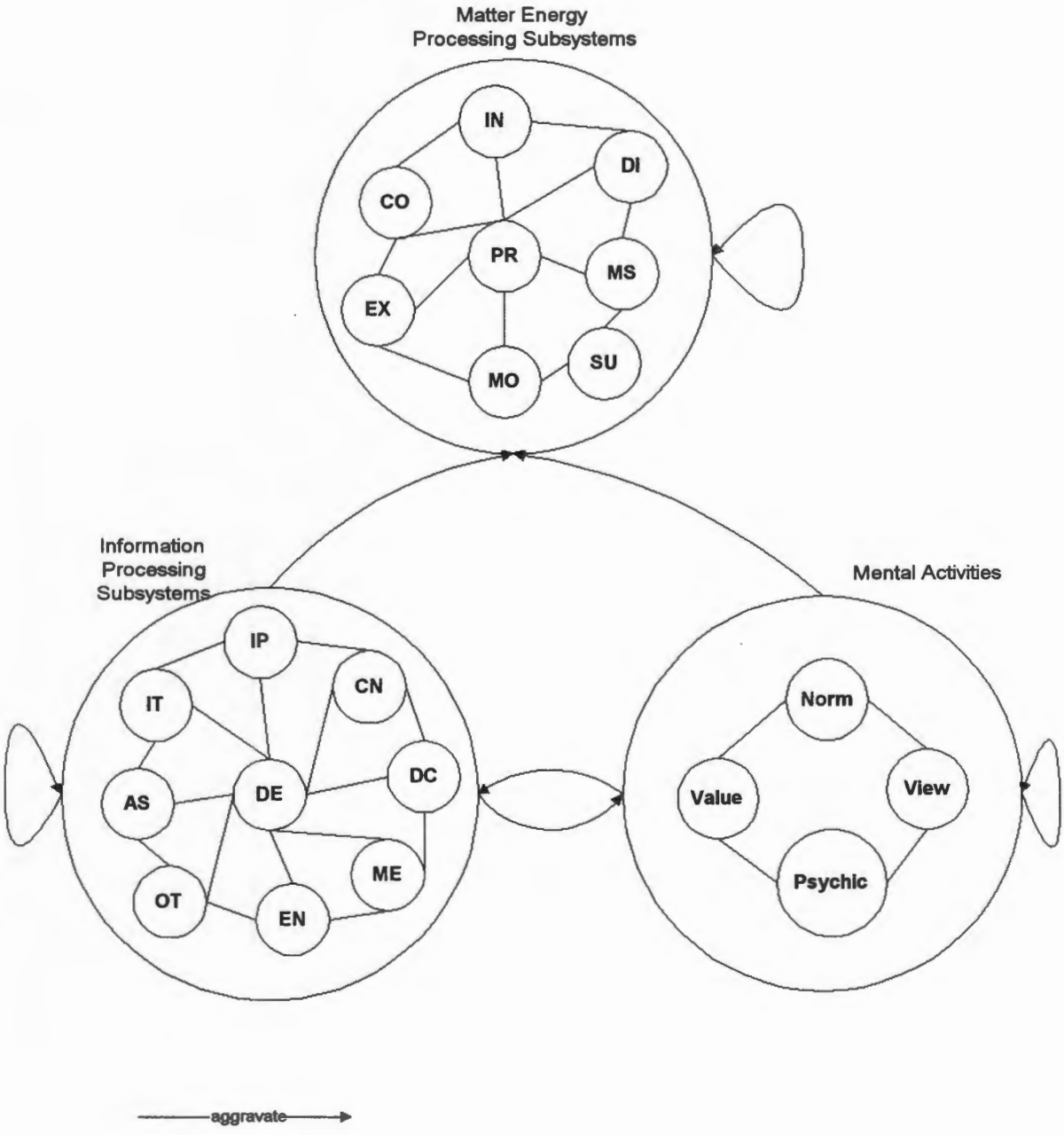


Figure 6-1: The Aggravation Relation of the Three Primary Subsystems of Organization

Chapter 7 The Complex Problem of Organization

'The Tao that can be described is not the eternal Tao'.
- *Tao Te Ching (Book of Virtue), Lao-Tse, 561BC*

This chapter attempts to explore the essence of organization's complex problems. Exploration of the essence of complex problems can help us to approach the source and pattern of the complex phenomena of pathology. The exploration serves as a base for establishing our diagnosis framework proposed in Chapter 8. This chapter attempts to illustrate problem and complexity. The illustration suggests they are associated with casual relation. Because no universal law about casual relation is defined and our knowledge about the world is partial, we are not able to draw a conclusive claim about the derived complex problem. . It reveals that complex problem is a cognitive phenomenon. As such, this chapter suggests tackling complex problem through a learning based model interchanging process, which could compensate each person's cognitive incapacity. On the other hand, inasmuch as complexity and problem are of mental or cognitive origin, this chapter probes 'what' specifically they are in the human mind. The probing indicates that they can be categorized into 'thing' and 'people'. The complex problems that pertain to 'thing' are about human's incapacity to understand diversified and dynamic behavior of things (or function in terms of structural and process perspective). The complex problems that pertain to 'people' are about human's incapacity to understand what people are thinking. The suggested learning based model interchanging approach strives to embrace each observer' mental model. Through interchange of observers' mental models, we may acquire a more comprehensive knowledge about organization problem.

7.1 Where is the Problem?

People seem more concerned with *what* a problem is than with *where* it is. As a result, the 'where' is not given as much attention as the 'what'. However, we contend that the exploration of 'where' should take precedence over the investigation of 'what'. If we want to seal a roof leak, we must know 'where' the leakage is, so that we can prevent

water from dripping on to the floor. No matter whether the subjects of interest are tangible or intangible or observable or unobservable, exploration of 'where it is' may help us to approach 'what it is'. Freud (see Mitroff & Linstone, 1993, p. 104) perceived three layers of social life: professional, political and personal. The first is the most current and readily accessible. The third is the deepest, least current and accessible. It is about our feelings evoked by sensation.

In the sixth century, two Chinese monks' arguments about wind was moving or flag was moving manifests the deep feeling in each one's sensation. One argued that the flag would not move by itself unless the wind blew upon it. Therefore, the cause of this phenomenon was the wind's movement. However, the other argued that without the flag's quality of mobility in such conditions, it would not move at all. Hence, the other insisted the flag's quality of movability was the cause of this phenomenon. Since fact does not lie, any discrepancy between data and concepts are usually ascribed to defects in concepts. The argument evolved into a quarrel and neither monk was prepared to concede defects in their concepts. The sixth patriarch of Buddhism, Hui Neng, reconciled their argument and said: 'Neither wind nor flag is moving; your hearts are moving.' The sixth patriarch did not mean that people did not need to think. In fact, he simply indicated that people's sensational feeling is the source of this disputing problem. In terms of Freud's third level of social life, personal, the least accessible and deepest is the sources of forming problems.

This story maintains that because individual sensations differ, each person has his own view concerning problems. This is exemplified by a mother who loses her child on a stormy night: whether the wind or the rain is moving is not a problem to her, because her urgent concern is to seek her desperately crying child.

Let us illustrate why problems are inwardly generated rather than externally created. Is a car breakdown a problem? For a person very reliant on driving a car in his everyday life, the malfunction of his car will be a problem. It can compel the owner, in order that he might return to 'normal life', to seek a technician to repair the car. However, for a car owner who very much enjoys bus transport, car malfunction is not a problem at all. This

person might leave the car in the dust and take a bus instead. For a person who enjoys walking, it is not a problem either, even if the bus breaks down. He will walk instead. Therefore, whether car malfunction is or is not a problem, is not generated by the car, but is initiated in people's minds. Is aging a problem? For people who want eternal physical health and strength, aging is a problem. They seek reliable cryogenic technology to freeze their corpses for the day when technology is sufficiently advanced to unfreeze their bodies and restore them to life with damaged organs replaced. However, for the people who are happy with the natural progression, aging is not a problem. Therefore, the issue of whether aging is a problem or not does not depend on our organs, but on the orientation of our minds. Does time pass too fast or too slowly? Time actually passes constantly and regularly, but when we are teenagers or children, we might feel that time passes very slowly. However, when we grow to certain age, we might feel that time flies too quickly. What is wrong with time? If we try to analyze time we cannot acquire answers because the quality of time is uniform. There is no 'fast' or 'slow' time. The answer does not lie in 'time'. Rather, it lies in our sensation activity, which is driven by our minds. While the same wind is blowing, a person might feel annoyed or invigorated at different times. In fact, the wind does not have the property of invigorating or annoying. Thus, the way we perceive a matter is a deterministic factor affecting the characteristics of a problem.

In organization, while different levels of people face an urgent issue, they might take different reactions. For shop floor level staff, following standard operation procedure (SOP) might be preferred because SOP could protect them from condemned. However, for the superiors, efficiency might be the primary concern because it involves promotion. Different feeling and concern leads to the complex nature of problem. Problem is unlike unshakeable fact. It hinges on people's subjective sensation. It possesses uncertain characters.

Oxford English Dictionary defines problem as a 'doubtful' or difficult question; a question that exercise 'mind'. The Webster's Third World New International Dictionary defines problem as an 'issue' marked by usually considerable difficulty, 'uncertainty' or 'doubt' with regard to its proper 'settlement'. Kant (1990, p. 56) holds that 'problematical' represents 'possible' judgement, in contrast to assertorical, which is true

proposition, and apodictical, which is necessary.

Pidd (1996, p. 72) argues that problems are 'social' and 'psychological constructs'. That is like 'beauty', there is a sense in which they are defined in the eye of beholder. This does not mean that ever aspect of the issues to be faced is within the mind of the analyst or the participants. That a business is heading for bankruptcy or that a hospital is failing to provide adequate response times may be beyond dispute. But the interpretation of these 'facts' is less certain. It should, therefore, be expected that different people might interpret the same issues in different ways. Pidd's arguments echo Ackoff's views. Ackoff (1974b) elucidates that problems are 'taken up by' instead of 'given to'. He points out that a problem is constructed by people as an abstract mental construct. Thus, the problem is in our mind and it is neither observable nor tangible.

Consequently, in societal system, while human participate in an issue, the nature of problem is alterable or uncertain. The uncertainty is ascribed to human's mutable mind. The so-called 'hard problem', when imbued with human mind, is succumbed to human's perception and preference. The 'hard problem' pales into insignificance under inscrutable human's mental activity. As such, problem is closely associated with people perspective. It is in the deepest and least accessible human mind.

7.2 Where is Complexity?

Tarnas (1996, p. 418) illustrates human knowledge, as such, from Marx, Nietzsche, Weber, and Freud to Heisenberg, Wittgenstein, Kuhn and Foucault is radically interpretive. The consensus is decisive. The world is in some essential sense a construct. Tarnas explicates that every act of perception and cognition is contingent, mediated, situated, contextual theory-soaked. Human language cannot establish its ground in an independent reality. Meaning is rendered by the mind and cannot be assumed to inhere in the object, in the world beyond the mind, for that world can never be contacted without having already been saturated by the mind's own nature. Clemson (1986, p. 1984, p. 8) argues for the similar concept. Clemson uses pencil to illustrate that human knowledge is partial. Although we could make an extensive measurements of pencil's' physical

characters, we get stuck while we intend to investigate its relationship to human being. Is it a chewing instrument, a sword for, a cheap billboard or a tool for scratching head for generating idea? As such, whatever we know about a pencil is a small selection will be some small selection of the potentially knowable.

Tarna and Clemson's illustration indicates human's cognition and language, at most, partly grasp world phenomena. The Chinese Taoist Lao-Tse (who is recognized as the founder of Taosim) put down a verse, which portrays the limitation of human language and mental power. He says:

The Tao that can be described is not the eternal Tao. The name that can be named is not the eternal name. The nameless is the origin of heaven and earth, while naming is the origin of the myriad things.
(*Tao Te Ching* (*Book of Virtue*), Lao-Tse, 561BC)

Lao-Tzu's words reveal that describing is the product of language. Language is composed of words, which can be interchanged. Inasmuch as interchange takes place, transformation occurs. Since this occurs, the describing will evolve to diversified interpretations and various understandings. A consequence of linguistic activities is that the described 'Tao' is not invariant and eternal.

'The name' means the 'eternal name', which is indeed a 'nameless name'. 'Named' connotes the names of myriads of things, including abstract images. Their names can be changed or diversified. Besides, the myriads of things represented by those names are not eternal and invariant because of aspects of the nature of transformation, such as deterioration and destruction. In a sense, before the cosmology and transcendental world were formed, the origin was nameless. After the myriads of things were formed, including human appearance, humans started to give names to them. Thus, before human beings appeared, 'complexity' did not exist at all. When does complexity start to exist and how does it develop? Humankind creates the name of 'complexity' and interprets the notion of it. 'Complexity' is meaningful only when a human observer intends to comprehend, or expound on, the observed phenomenon. (Nature never says that anything

is complex.)

In *The Doctrine of Mean* (*Doctrine* means eternal and invariant truth. *Mean* stands for unbiased principle), Confucius says: 'In archery, when the arrow misses the centre of the target, a gentleman turns round and seeks for the causes of his failure in himself' (The Doctrine of Mean: XIV, BC 402?). In a sense, we should not ascribe our failures to external things, such as the wind, a too colourful target or the noise of the audience's gossip. By the same token, we should not attribute complex problems to the outward situation, but as originating from human minds, the incapacity of human mental power being inherent in them.

Moreover, the essence of 'complexity' is not eternal. It very much depends on each observer's capacity and talent. What we call a 'complicated' mathematical algorithm is really complex to a layman. However, it seems very simple to a skilful mathematician. A mathematician might feel that the dance step of a ballet dancer is complicated, but to the dancer it might be simple. Therefore, each human has his own perception of complexity. As Siu (1957) says, the same word does not elicit exactly the same meaning in two persons. The final outcome lies in the light of the individual's own 'experience' and not in the word itself. This notion applies to the meanings of certain abstract terms, such as 'benevolence'. Though each person has his own concept of benevolence, in social science, for discussing and measuring 'benevolence', we establish indicators of benevolence through the agreement of the scientific community. Pepper (1942, p. 47) coins the term 'multiplicative corroboration' to represent this type of agreement. It is a corroboration of man with man. An agreement about benevolence might involve visiting shelters for the homeless once a week, donating a certain percentage of salary per month to a charity organization, weeping whenever one sees a touching scene, and so forth. Although these indicators are always vulnerable to question, they are seen as the reality of benevolence and are acceptable to the science community. 'Complexity' is also an abstract concept. However, it is evoked by human mental inadequacy. The scientific community also endeavors to establish the indicators of complexity.

Warfield (1999) holds that complexity is in the human mind, rather than in some corpus

that the human is striving to comprehend. For Warfield, complexity does not exist in itself, but only in the mind of a human observer observing what we call a 'complex situation'. As Descartes (1956, p. 2) says, 'differences of opinion are not due to difference in intelligence, but merely to the fact that we use different approaches and consider different things'.

7.3 What is Complex Problem?

According to the above illustrations, complex problem is human's mind construct. Problem is our determinations whether an issue should be concerned. Complexity is about our mental incapacity of appreciating a situation. As such, complexity reflects the form of our partial knowledge about a phenomenon. Inasmuch as problem hinges on human perception, the nature of a complex problem is alterable and dependent on each observer's judgement. With regard to the complex problem, generally, most contemporary views held by the scientific community can be divided into two streams. The first stream is concerned with human's inability to understand the immense diversities in nature. For instance, Bertalanffy (1968, p. 54) says that complex 'elements' may be distinguished in three different ways:

(1) according to their number,
(2) according to their species, and
(3) according to the relations of their elements.

Beer (1979, p. 32) says that complexity can be denoted by 'variety', which is defined as the number of possible states of anything whose complexity we want to measure. The assertion of the first stream reflects 'countable', 'computable' and 'measurable' indicators of a complex problem. Warfield (1994b, p. 133) coins the term 'situational complexity' to denote this sort of complex problem. However, situational complexity does not exist by itself. That is, the situation could not proclaim it is complex because it doest not have such device to make distinguishing. It arises while human could not appreciate the variety of things and their states. Owing to different appreciations and feelings, the observers may elicit different interpretations from a situation. This causes the situation connected to the above-mentioned 'subjective pleasure' in Siu's thesis. If the

observer is a creative man, immense factors could be taken into account. If the observer is a simplicity man, certain issues could be regarded as 'not problems'. Hence, the observers' appreciations and feelings could escalate or attenuate the complexity of a situation. As a consequence, the observers' subjective thoughts play important parts of the system. This leads to the germination of the second stream.

The second stream is concerned with the human inability to understand what 'people are thinking', the complexity indicator of which is intangible mind activity. An argument between the Chinese Taoism philosopher, Chung-tzu, and his friend about whether a fish is happy, may illustrate this kind of human incapacity. Chung-tzu (BC369-BC286) and his friend once strolled together. As they passed a pond, they saw a fish in the water. Chung-tzu's friend said, 'Isn't this fish happily swimming in the water?', but Chung-tzu questioned his friend: 'You are not the fish; how do you know whether the fish is happy or not?' Chung-tzu's friend refuted his argument, saying: 'You are not me; how do you know whether I know that the fish is happy or not?' Subsequently, Chung-tzu further questioned his friend: 'You are not me; how do you know whether I know that you don't know whether the fish is happy or not?' The point of this argument is concerned with Chung-tzu's thoughts about inquiring and casts light on the effect of assumption and speculation. However, the argument illustrates the unfathomable nature of human mental activity. We cannot through observation understand how people perceive an issue. Vickers (1963) calls it 'appreciative behaviour', which is unobservable in the sense in which scientists observe the behaviour of rats and stars.

The diversity of angles from which an issue is perceived and interpreted leads to the second type of complex problem. For example, in one of Chung-tzu's books - *Qi Wu Lun (On Ordering Things)*- it is recorded that Chung-tzu poses a question: 'What is the most delicious food in the world?' He asks a human, who replies that lamb, beef, fish and chicken are the most delicious foods. He asks a deer, which answers that tender grass is the most delicious food. (Here we do not speculate how Chung-tzu communicates with animals). The centipede's predilection is for snakes. On the other hand, owls and crows favour dead mice. In the end, Chung-tzu cannot come to a conclusion as to what the most delicious food in the world is. Similarly, if we ask people what the most elegant painting

in the world is, the replies will be diverse and we will not be able to reach a conclusive judgement. This type of complex problem also exists in management. For instance, to optimize an equation is a matter of algorithm; however, determination of objective function involves discrepant opinions. Each stakeholder has his own view on what objective should be optimized - profit, safety, or total sales. Allocation of national resources is another example. It involves a great number of stakeholders' interpretations of the problems, and their perceptions. Warfield (1994b, p. 133) calls this type of complex problem 'cognitive complexity'.

Flood and Carson (1993) summarize the different perspectives on complex problems and postulate that complex problem is consisted of 'people complexity' and 'thing complexity'. 'People complexity' connotes values and beliefs, interests, capability, notions, and perceptions. 'Thing complexity' implies numerous elements and relations, with characteristics of non-linear relations, non-holonomic constraints and asymmetry. Additionally, the integration of the features may entail hierarchy and emergence.

According to Flood and Carson's portray, the two types of complex problems are interconnected. The interconnection is similar to the postulation of this thesis, i.e., interconnection between functionalistic perspectives (consisted of structure and process perspective) and people perspective. However, while they are interconnected, the pattern of complex problem is not such well structured. 'Messy' can represent this concept. Mitroff and Linstone (1993, p. 109) expound 'messy'. They stress something is a problem if and only if within it is contained every other problem. Or, conversely, something is a problem if and only if its definition solution both lead to and follow from the definition and solution of every other problem. To put it mildly, the 'inputs' into unbounded system thinking are 'messy' indeed. Mitroff and Linstone's arguments reveal systemic nature of problems. In other words, problems are connected by casual relation. Besides, each observer has his own mental model of understanding the world. For the same fact, such as the cause of economic recession, people's reasoning could range from 'lack of education', 'lack of security' to 'lack of land'. All the reasoning could be sound plausible. But, insisting on any assumption might kill the other valuable insights and causes over complicated, or over simplified model.

Musès (2000, p. 614) believes this sort of complexity arises from not seeing things clearly enough – either through lack of experience or ability, or from an excessive obfuscating conditioning beclouding the perspective mind. We have to give way the hubris heretofore attached to much of the human scientific method, towards a more realistic intellectual humility to solve the vast problems our too species-centered approach has brought down on our head and, if uncorrected, on those of coming generation. This idea leads to a need of humility idea which can compensate our limited capacity and ability.

7.4 Coping with Complex Problems through Learning Based Model Interchanging

The above illustration alludes that organization problem is unlike mathematic in which optimal solution is immediate. On the stand of multiple views, there is no universal pattern of organization problem. Each professional or person might hold different opinion or model on the same issue, though chapter 6 derives a general pathological pattern for bureaucratic organization. Model actually represents the observer's view of the world, rather than the reality of the world. Constandache (2000, p. 1070) argues that scientific mode presupposes rigorousness and precision. It is easier to be handled and controlled than real phenomena. It is here that risk may occur that this becomes the sole object of the scholar's preoccupations. Many theories and disciplines have derived from investigations into the properties of models. It follows that the human mind can attain better knowledge of itself, since it is both the conceptive author and maker of a personal replica of things in nature. According to Constandache's argument, models are actually conceived with the purpose of answering certain peculiar questions. They do not explain the world as such. Instead, various scientific models tell us something about the world of scholars. Let's use the issue whether we should build a nuclear power plan as an example to demonstrate. The biologist usually more concerns the affect on ecology system. The economist usually more concerns the pay off in a long term. The neighborhood civilians usually more concern whether the nuclear power plant might explode or the effect of its radiation. Every observe might submit different reasoning to substantiate his opinion, to build or not to build the nuclear power plant.

Hence, model, representing a system, actually embodies the observer's personal view. It does not exist independently. Ghosal (1999, p. 378) argues that system do not exist in the real world. They are constructed by individuals in relation to a problem in view by taking into view complexity and uncertainty. The individuals may perceive different system definitions for the same problem. As such, Ghosal appeals to us to take observer, researchers, administrator, etc. into consideration. Such consideration is extremely important. It reminds us that a verification (induction) of organization problem through single observer's view is inappropriate. We need group to collaboratively diagnose organization. This idea helps observers to avoid capturing only portion of a problem (system) and leads to totalitarian solutions.

But, merely collaboration could not guarantee a concrete result, which can incorporate each observer's mental model. A solution simply obtained by voting may lead to impediment of capturing the large picture of a system. We need an approach that can enable us to learn and espy the complication of a problem. That is, it should promote exchanging of the observers' mental model. The model interchanging should be a learning based approach that corresponds to the ethic of knowledge, illustrated in chapter 2.5, i.e., enhancing mutual understanding. The following chapter devotes to seek an appropriate methodology, which corresponds to this idea.

Chapter 8 Towards Interactive Management to Diagnose Organization Pathologies

'A man should not worry that other people do not understand him. He should worry that he fails to understand other people'.
- Confucius Analects, I/16, c.a. 400BC

The purpose of this chapter is to develop a framework for the induction phase of this study. The developed framework is for diagnosing an organization and for testing whether the speculation about pathological pattern of bureaucratic organization in Chapter 6 is plausible. The framework is based on Interactive Management and Living System Theory. Its endeavor is to unearth organization's problems in terms of multiple views and a systemic pattern. The framework attempts to embody the concept of pragmatism maxim, usefulness of knowledge, multiplicative corroboration of knowledge (collaboration and mutual understanding) to establish 'consensus' on pathology of bureaucratic organization for proceeding to obtain solutions to the problems.

However, as our discussion in Chapter 6 shows, pathology is a form of causal relation. We will first illustrate the meaning of relation to organizational issues. We conclude that pathology is an organization issue about 'aggravating'. But, through review of several studies, there are no universal laws that can claim the existence of causal relation between two events is definite. At best, we may only claim that the discovered 'aggravating' relations of an organization are tentative or plausible.

As we have discussed in Chapter 6, problems and complexity are cognitive phenomena. They are abstract and invisible. Each person has his own view of problems. Each person has his 'idea' of unraveling the complexity of his problem. We cannot know how each person perceives a problematical situation if the person does not disclose his perception. Hence, the appropriate way of surfacing problems and coping with complexity is through 'communication' and 'cooperation', rather than through a researcher's observation and

interpretation.

'Communication' means interaction. If a patient does not want to communicate about his problem, a doctor has difficulty in starting the diagnosis. The information conveyed by talking can help us to focus on a specific part rather than attempting to check the whole system. For a psychologist, if a patient is unwilling to communicate, it will be difficult for him to understand the patient's problems. Therefore, 'communication' is an effective means of surfacing the problems whose nature is invisible and intangible. 'Cooperation' means broad participation. On the one hand, broad participation promotes democracy. As the above- quoted Confucian words illustrate, we should worry that we do not understand people, rather than *vice versa*.

On the other hand, 'cooperation' compensates for human's limited mental capacity. A group of people brainstorming can generate a larger picture about a situation than one person brainstorming. As such, each stakeholder could appreciate the other stakeholders' mental model. The two vital activities – interaction (communication) and cooperation – are a central part of the framework proposed in this chapter. The objectives of the two activities are to take 'learning' and 'model interchanging', discussed in the previous chapter, into account.

But, what language should be used for 'communication' and 'cooperation' to bring pathology to light? Besides, the language should enable us to surface the pathological pattern of the abnormal state of an organization. The pathological pattern is concerned with the aggravating relations of identified problematical components. The 'aggravating relation' of problematical components is a crucial factor for assessing the suitability of a language for this study.

A number of approaches have been developed that can be employed to identify the sources of pathology. We will review some prevailing approaches, which may contribute to the discovery of organization pathology, such as statistic, syntegrity, AHP and so forth. But, we will evaluate the adequacy of the reviewed approaches with relation to the objective of this research. The evaluation criteria filter out the unsuitable approaches for

this study and suggest Interpretive Structural Modeling (ISM).

8.1 About Relation of System Components

'Relation' is the predicate that correlates individuals. Flood and Carson (1993) explicate that relationship can be said to exist between *A* and *B* if the behaviour of either is influenced or controlled by the other. For example, the predicate 'love' may stand for the close relation between two persons. The predicate 'is part of' may represent the 'included in' relation of several individuals. In daily management activities, relation is a frequently discussed subject. For example, what solutions can 'help' us to curb inflation? What problems 'cause' the low performance of our organization? What activities should 'precede' distribution of resources?

Warfield and Roxana (1994a) summarize several management products, in which miscellaneous relations spell out the association of individuals. The products are:

(1) DELTA Chart: It is the relation like 'precedence', that structures the order of a set of events, decisions and actions that can characterize a methodology. The three types of elements, connectives (AND, OR), and relation (shows the order in which the elements occurs in time) constitute the ingredient of DELTA charts. As such, D stands for 'decision'; E stands for 'event'; L stands for logic elements (i.e., AND or OR); T stands for 'time'; A stands for 'activity'. The five make up a sufficient set to describe and prescribe a process appropriately. DELTA chart has the advantage of: common language, compact description, clarity of sequencing and nesting (see Warfield, 1994b, p. 196 for the detail of each advantage and the portray of each elements). Some usage of DELTA chart for designing organization will be introduced in chapter 10.4.

(2) Problematique: It is the relation like 'aggravate' (increase the severity of), that shows how a collection of problematical elements interact in a certain way to create a problem situation. When a set of problems is structured in this way, some problems will lie at extreme left of the map (called 'root difficulty' or 'fundamental problem' by Warfield) and some will lie at extreme right of the map (called 'surface difficulty' or 'symptom'). The nature of problematique very corresponds to Mitroff and

Linstone's idea about problem (see chapter 7.3). It also embodies the spirit of pragmatism maxim, i.e. prediction.

(3) Enhancement Structure: It is the relation like 'enhance', that shows how a set of proposed improvements are interrelated.

(4) Intent Structure: It is the relation like 'support the achievement of', that shows the contribution relationship of a set of goals, objective and aims.

(5) Curriculum Structure: It is the relation like 'should be learned before or co-requisite with', that shows a pattern for sequenced study and learning of knowledge or experience packages.

(6) Priority Structure: It is the relation like 'is of distinctly higher priority than', that shows the sequence of priority of a set of activities.

The foregoing summarized 6 relations may reflect some issues of major concern in an organization. However, delving into the pathological pattern of an organization is associated with 'problematique'. It is the relation of how problematical components mutually interact and lead to the abnormal state of an organization. It helps us to identify the sources of problems, thus enabling us to proceed with actions to intervene in the unsteady situation.

To decide whether aggravating relationship exists between two elements is a difficult task. It involves how we ensure such causal linkage is valid. Carnap (1995, 216) offers two guidelines to us to judge whether causal relation exists between two events. Firstly, everyday speech does not speak of A causing B unless B is latter in time than A and unless there is a direct line of causal events from A to B. Secondly, when A and B are the end results of long causal chains that trace back to a common cause, it is not said A causes B. But Carnap comments on the second guideline. Carnaps says 'there is no reason why the term causal law cannot be used in a comprehensive way that applies to all the laws by which certain events are predicted and explained on the basis of other events, regardless of whether inferences go forward or back in time'. This idea reminds us to reconsider the strict sense of casual relation. Is the conventional deterministic concept certainly right? At least, Carnap suggests us to consider probabilistic law. Some basic laws of this world are probabilistic, the deterministic law does not hold. But it does not mean we could not

establish a causal model, which can predict the likely situation. As chapter 2.3.4 shows about deduction, if the contextual relation is probable, the derived claim is probable too.

Shaw (1997, p. 151) is convinced that it seems unlikely that general law can be given for discovering causes. Shaw reviews John Stuart Mill's *System of Logic* (written in 1843) on five cannons of which three most important are stated, and some objection to them. The three cannons are:

(1) The method of agreement – Suppose we observe several instances of a phenomenon and in all those instances we find some common factors. Then that factor is the cause of that phenomenon. But, if there is plurality of causes the inference will fail. For example, the cratering on the moon have thing in common (e.g., being circular), this common factor would be irrelevant. In fact, it could be caused by now-extinct volcanoes or by meteorites hitting. Even if there is a single cause, it need not be the common factor picked out. The common factor of green hair might be the symptom of toes to drop off. It should not be regarded as the cause of this phenomenon.
(2) The method of difference – If two cases are exactly alike, nevertheless, they are observed different phenomenon. We find some further disparity property between the two cases. Then the further property is the cause of the phenomenon in question. The same problem is similar to the instance of previous passage. One of the twin's hair turns to green and toes to drop off, while the other does not have such phenomenon, could not ensure green hair is the cause of this phenomenon.
(3) The method of concomitant variation – Whenever one phenomenon varies in a regular way as another varies, they are causally connected. But, according to this cannon, it seems plausible to claim that the sale of hot drink in Britain causes the sale of cold drink in Australia because they vary together. Indeed, this claim is absurd because both stem from remoter causes. This is a problem while we intend to apply statistical correlation for discovering causes. This issue is further discussed in chapter 8.3.1.

The above illustration shows that general law of causal relation is still not robust. This problem is manifested on Siu's (1957, p. 28) interpretation of Hume's successful

challenge on determinism. Siu writes 'Hume concludes that objects have no discoverable cause and effect connection between them. Causation is not an independent relation but a sequential derivation. He argues further that experience of frequent conjunction in the past does not necessarily guarantee the same conjunction in the future. The supposition that the future resembles the past is derived entirely from custom'.

As such, a general theory of causal relation is still to be quested for. In addition, the above cannons apply primarily to observable facts. But, people perspective is an invisible reality. People's deepest personal character may impact the performance of an organization while we could not sense the sources of impact. It is difficult to rely on the tentative cannons entirely to derive causal relation or problematique. We need an idea to complement this insufficiency. In some way, Pepper's idea of structural corroboration does not suffice for validating the existence of causal linkage. As the above sections illustrate, cooperation, interaction and interaction should be injected into the proposed methodology. In other words, multiplicative corroboration is indispensable to testify the causal bond between two events. A language that can embody both types of corroborations to substantiate a causal claim is required.

But, what language should we employ to surface the pathological relation? Selection of a language that can surface the interested relation should take several criteria, in light of the purpose of this study, into account. These criteria should reflect the validity of the induction phase and the spirit of pragmatism. The next section lists the criteria for putting forward a suitable methodology for the purpose of this research.

8.2 The Criteria for an Intervention Framework

The framework for surfacing the pathological pattern of bureaucratic organization should meet 5 criteria. The 5 criteria are for the purpose of this research. They are listed below:

(1) First, the criteria of the intervention framework for this research should reflect the validity of the induction phase as mentioned in Chapter 2.5 (face, predictive,

construct and content validity).

(2) Second, as we discussed in Chapter 7, the complex problem is a cognitive phenomenon. As a result, the framework should have the power to unearth the various mental models hold by different people, and to facilitate model assimilation.

(3) Fourth, the product of the framework should be able to show the 'pattern' of pathology. By 'pattern' is meant the aggravating relation that provokes the unsteady state of an organization. The pattern should display both *functional pathology* and *mental pathology*. In a sense, the pathological pattern presents prediction, which is the spirit of pragmatism maxim (see chapter 2.3.1).

(4) In light of the ethic of knowledge, the proposed approach should be able to embrace diversified opinions and reach common understanding. This suggestion entails the need of the next criterion.

(5) Fifth, the framework should be able to refine knowledge via 'multiplicative corroboration', in which consensus of a plurality of people spells out reality.

Item 1 contains the general criteria of the validity of measuring. The verifying process should be logical and agreeable. The measuring result should be broad and predictive. Items 2, 3 and 5 support one another. For problem and complexity are cognitive phenomena and the effective way to unearth them is to eliminate the bondage that impedes them from appearing. 'Interaction' and 'collaboration' are the catalysts to generate concord, corresponding to the ethic idea of pragmatism, in which multiplicative corroboration sheds light on the reality. Item 3 concerns whether the framework can produce a model that casts light on the systemic nature of pathology. Some prevailing methodologies can be employed to identify the source of organization problems. We will briefly review several approaches and discuss the suitability of these approaches for the induction of this study.

8.3 Some Prevailing Approaches for Discovering Problems

8.3.1 Statistical Correlation

The interaction of problematical components can be explained as the manner in which the problematical elements mutually cause undesirable states in one another. In statistics, some criteria are put forward to validate the existence of causal relation. Babbie (1995, p. 70) mentions the criteria of causal relationship. An important criterion is that the observed empirical correlation between two variables cannot be explained away as being due to the influence of some third variable that causes them. Babbie gives an example using ice cream sales and deaths from drowning. Although ice cream sales and deaths from drowning have a positive correlation, they can be explained away by the third variable 'temperature'. Thus, it is inappropriate to say that the increase of ice cream sales causes an increase of deaths from drowning. Instead, the cause is temperature. Trochim (see Trochim's web page) holds the same opinion. Trochim argues that although there is a correlation between the number of roads built in Europe and the number of children born in the United States, the correlation of the two variables is not causal because the *third* variable – good economy - can cause both of them.

However, in some cases, this criterion is dubious (see Carnap's comments on such guideline in Chapter 8.1). For example, mild weather can cause grass to flourish. Mild temperature can also cause deer population growth, owing to the suitable conditions for mating. According to Babbie's idea, there should be no direct link between the flourishing of grass and deer population growth; i.e., the flourishing of the grass would not cause deer population growth. This claim seems absurd and unreasonable. Obviously, the statistical causal correlation could not unearth the causal relation of all cases. There are some snags within it. On one of the correspondences from John Warfield at 10 Oct. 1999, Warfield illustrate the snag:

'In my opinion, causality is greatly overrated. It is much too strong a relationship. ... Both physical and social scientists tend to place great emphasis upon statistics. Someone said that Statistics is the basic mathematics of the social sciences. But all statistical work is

constrained by the imagination of the designer of the experiment.'

Thus, we can see that a survey based on the researcher's predetermined variables could run the risk of being a biased view of the causal relation. For example, regarding the application of Living System Process Analysis, Ruscoe (1982, p. 203) critically argues that the difference in effectiveness of army units can, in part, be explained in terms of variation of 'environmental factors', rather than of information-processing subsystems. The apparently greater effectiveness of units stationed in Europe might, in part, be explained by the fact that their personnel needs are more rapidly met than are the personnel needs of the units stationed in the United States. Furthermore, differences in unit effectiveness are also clearly dependent on factors other than differences in the geographic location of individual units. Ruscoe's criticism exemplifies the potential problem of relying on statistical correlation to examine causal relation. The potential problem is about the validity of using statistical correlation to examine the relation between organization effectiveness and the variables of the19 critical subsystems. Some meaningful factors, which should form part of the causal relation, might be ignored during the exploration.

On the other hand, statistical correlation could not surface the stakeholders' *weltanschauung*. No atmosphere is created for 'interaction'. It could lead to the danger of a biased view. The invisible nature of a complex problem, deeply embedded in each person's mind, is not appropriately surfaced. Instead, the researcher's preference dominates the direction of the result.

8.3.2 Syntegration

Beer (1994) develops a team syntegrity (the term results from a combination of *synergy* and *integration*) model, which helps groups to generate plan, knowledge, and innovation in a messy environment. The team syntegrity model is a holographic model for organizing the process of communication. A set of 30 persons can organize itself, using the structure of an 'icosahedron'. (For different numbers of people solutions are possible with the help of other 'polyhedra'.) The 'icosahedron' comprises 12 vertexes. Each vertex corresponds to a team. The edge, which connects vertexes, represents a person.

Thus, 5 edges lead to a team. There are 5 members to each team. Each person as a player belongs to two different teams. On the one hand, this person is acting as a player of one team. On the other hand, he is acting as a critic of the other team. Therefore, each team consists of 5 players and 5 critics. The process of syntegration is as follows:

(1) Opening: The syntegration is initiated under a general topic that serves the mutual interests of the participants. The question is explicated in an opening question.
(2) Generation of the Agenda: Each participant provides opinions, which are important to him/her. Then the opinions are discussed and combined. Thereafter, through successive synthesis and prioritizing, the agenda for the actual problems is produced. The problems are phrased in 12 topics.
(3) Assignment to Groups: Each member of the set of persons decides on the topic to whose processing he or she would prefer to contribute. A corresponding listing of the individual preferences forms the basis for the assignment to the various teams with the help of an optimization algorithm.
(4) Working on the Topic: The individuals of a team, constituting 5 players and 5 critics, discuss their respective topic. Each team meets several times. The fact of the same problem setting with its different but interconnected aspects being continually processed by the same set of people, who gather in alternate composition, leads to a self-organizing process towards integration.
(5) Conclusion: Final coordination if necessary in Triplets (corresponding to the triangular face of the 'icosahedron'); presentation of the results in plenary.

Syntegration is helpful to a group of people to reach consensus on a disputed topic. However, the iterative process of interaction of syntegration is very time-consuming and, particularly, when the topic is urgent and a resolution has to be produced in a very short time, the combination of distant and local communication between the persons involved becomes a challenge to syntegration.

8.3.3 Analytic Hierarchy Process

Satty (1980) devises Analytic Hierarchy Process (AHP), which enables a group of people to make decisions collectively. Generally, AHP is applied to making choices among

alternatives in the light of multiple criteria. In brief, the alternatives are compared in pairs, in terms of the considered criterion. Comparison is established on ratio scale. Through the average of participants' comparison on a pair of criteria, the combined ratio scale is entered into the matrix. Calculation of the eigenvector and eigenvalue of the matrix reflects priority ordering of the alternatives and consistency of the judgment.

Although the application of AHP is primarily concerned with seeking solutions, theoretically, it can be applied to seek problems. For example, the foregoing criteria could be the indicators of problems, such as revenue, products stored in the warehouse, market share and so forth. The alternatives could be a list of problems, such as poor facilities, inadequate resource allocation, lack of intelligence, etc. The relation of the pair-wise comparison should be modified as 'more influential'. Following the algorithm of AHP, we can obtain the priority ordering of problems. The ordering can reflect the most significant problems to be solved.

AHP has the advantage of analyzing criteria in order to help a group of people to make selections among alternatives. However, in addition to the rank reversal arguments (see Dyer, 1990 and Satty, 1990), the 'silence' of AHP could impede learning and interaction. Each participant silently weights the criteria from his own perception without interaction with other participants. But, the lack of interaction and reasoning can lead the individual to retain his original position of perceiving the problem. It may mean that no shared picture of the problem is obtained after the process is completed. Consequently, the generation of knowledge is considerably deterred.

Besides, the systemic view indicates that elements of a system are interdependent. Yet the AHP software on the market, termed *Expert Choice*, does not have the function of building a non-linear hierarchy. Instead, the hierarchical structure is composed of independent components. The linear hierarchical structure reflects the approach of the mechanistic age, in which reductionism and determinism dominate the thinking.

8.3.4 Interpretive Structural Modeling (ISM)

ISM was devised by Warfield (1976). It is a methodology that enables a group of people collectively to build a model that can show the interrelation of system components. The relation used in structuring must be transitive (see chapter 2.4 about the arguments of transitive). The process of ISM can encompass different levels of people interactively and collaboratively producing a shared picture of a situation. The underpinned mechanism of ISM is binary matrix, which can logically infer whether certain relations exist between two elements. Elements of the issue can be obtained from prior work, such as brainstorming, idea generating. The produced result can help us to predict how the change of a component can affect the other components. ISM is computerized methodology. The elements will be entered into a computer. Through the completion of computer questioning and group discussion of the question, the computer computes and display a model of the relations among the elements. The interpretation of the model is discussed by the group. The discussion and interactive atmosphere in ISM can provide incentive for the participants to disclose the 'where' of the complex problem. Its interactive essence promotes concord on the produced result.

The quality of the result is very dependent on the skilful process facilitator. The facilitator must be facilitative rather than issue-involved. He/she should be able to harmonize the process and incite the participants at appropriate time. The facilitator's position must be neutral to avoid leading the process towards favour to certain persons. In addition to the need of a skilful facilitator, ISM needs a skilful computer operator to operate computer. It is favourable if another assistance is available to help posting flip chart, making record and so on.

In light of the set criteria for the methodology of intervening in the organization problem, ISM is relatively suitable for the purpose of this research. In accordance with Flood and Jackson's (1991, p. 327) suggestion in Total System Intervention (TSI), when the problem-context is characterized by 'pluralist' (miscellaneous objectives and views) and 'complex' (unable captured in a mathematical model), interactive planning can be employed with every hope of success. Thus, this research employs the interactive-based ISM as the underpinned mechanism to diagnose pathology of a bureaucratic organization.

A more detailed illustration of ISM and the intervention framework is presented in the next section.

However, the very hope of success of applying interactive based ISM does not mean it is suitable to all circumstances. For instance, building vision for an organization might be associated with short-term, mid-term and long-term vision. While we intend to apply intent structure to build the sequence of envisaging and to apply categorization to categorize the envisaging into short-term, mid-term and long-term vision, we might encounter timing problem. In the result, some long-term visions might help to achieve short-term visions owing to a premature categorization. Under such circumstance, it is suggested that people should encourage foreseeing problems and doing probelmatique. Then do a DELTA chart to see what sequence of actions to be followed. The question of timing should not be discussed until the action sequence is obtained.

8.4 Diagnosis of Pathology through Interpretive Structural Modeling (ISM)

The foregoing reviewed system approaches are shown to be unsuitable for the purposes of this research, with the exception of ISM. Our purpose is to seek the pathological pattern of a bureaucratic organization. The pathological pattern should manifest the root problems and show how the problematical components disperse 'disease'. The discovered dispersing relation should ground in transitive relation. Besides, the process of refining knowledge should correspond to Pepper's (1942) argument of multiplicative corroboration, where ethic is embedded in the design so that the 'where' of the complex problems can be unearthed. These requirements turn our attention to Warfield's (1976) Interpretative Structural Modeling (ISM). ISM is helpful in collaborative corroboration and in surfacing 'disease', which show the evolution of an abnormal situation. The function of ISM corresponds to Mitroff's strategies of discovering problems.

Mitroff (1998) suggests five strategies for formulating problems. They are:

(1) Pick the right stakeholders;

(2) Expand you opinions;

(3) Phrase the problem correctly;
(4) Expand the problem's boundaries;
(5) Be prepared to manage paradox.

The first two items are about participation and interaction among the relevant stakeholders (including the people affected). This idea hints that organization problems should not be intervened in through a researcher's perception. Rather, the design process should allow for the participation of the relevant stakeholders. The third and fourth items indicate that problems have to be articulated so that all the participants grasp the meaning of the posed problems. The last item is about reconciling different views on a problematical situation.

Correspondingly, Warfield (1994b, p. 15) points out four universal priors to science. Warfield's four universal priors to science are:

(1) human being;
(2) language;
(3) reasoning through relationships;
(4) archival representation.

In terms of 'human being', we should understand the importance of 'roles', 'attributes', 'individual behaviour' and 'group behaviour'. 'Role' corresponds to Mitroff's strategies of picking the right stakeholders. It means to embody the diversified roles of people to participate in design. Model interchanging takes place during the interactive process. 'Attributes' refers to people's mental capacity. 'Individual behaviour' concerns each person's skill and view. 'Group behaviour' is about the brain- storming of a team and the consensus of the produced result. In terms of language, reasoning and archival representation, Warfield (1974) devises the technique, Interpretive Structural Modeling (ISM), that deals with people's perception and logical reasoning (which reflects construct validity) to generate a digraph (which reflects predictive validity) that shows the problematical situation.

Warfield (1994a) further develops ISM to incorporate Nominal Group Technique (NGT) and categorization. The incorporation generates a more extensive methodology, which is termed Interactive Management (IM). NGT is a ranking technique for producing priority. Warfield (1994b, p. 214) delineates the procedure of NGT as follows:

(1) Generating ideas;
(2) Clarifying ideas;
(3) Doing a preliminary partitioning of the set of generated and clarified ideas, based on a criterion of relative saliency; and
(4) Helping to build a spirit of participation and teamwork or group morale.

At the first place, the participants generate a list of issues, problems or solutions to be ranked (This step reflects face validity.). There is no limitation to the number of proposed elements. Through clarification, we clarify the meaning of each element and eliminate the duplication. However, it is possible that new elements are added to the set during clarification. Then, each participant ranks the clarified elements. For saving significant time, we can request the participants to rank the 5 most important elements, instead of ranking all of the elements. By combining the ranking of each participant, we can produce a list of combined ranking. NGT plays an important role of the fifth criterion discussed in chapter 8.2. It helps to group to reach common understanding with an issue to elevate work morale.

The next step after NGT is category. Category is a procedure that classifies the elements and places the elements with similar attributes in the same set, and labels it. Category is conducted with the assistance of a computer. The software can be designed to pose questions such as: 'Should element *A* be placed in the same category as element *B?*' Through the stakeholders' discussion, we determine whether the two posed elements should be placed in the same category. If they should be placed in the same category, we tick 'yes' on the posed question. If they should not be placed in the same category, we tick 'no'. The iterative process will generate a set of categories of selected elements. We can obtain the combining score of each category through the position of category elements in

the structured model. The combining score can reflect the influence of each category on the system. The method will be illustrated in the next chapter.

We can see that IM uses three scales - ratio scale, nominal scale and ordinal scale. NGT is a technique based on ratio scale. Category is a procedure based on nominal scale. ISM, the primary phase of IM, is based on ordinal scale, which shows the structure of a problematical situation. The ordinal scale has the advantage of representing certain realities that could not be represented by measurable variables. For example, it is not apposite to quantify our mood and correlate our mood with work performance. However, the ordinal scale of ISM can represent the situation in a digraph, which is a suitable language for describing the situation.

The purpose of ISM is not merely a method for building an ordinal scale model (digraph), but a mechanism for elevating people's learning. As we discussed in Chapter 2, learning is an important part of inquiring. Besides, chapter 7.4 argues for a need of learning based 'model interchanging' approach. ISM provides an interaction process that helps each member of the group to interchange ideas and grasp the bigger picture of a situation. Moreover, each member has opportunities to absorb the other people's valuable opinions or to express his opinion to contribute to the problem-solving. As Janes (1988, p. 153) points out, ISM has the benefits of focused debate, clarification of thinking, group learning and team building.

One of the primary purposes of this research is to apply ISM to seek the aggravating relationships between the people aspect and the functional (structural and process) aspect of a bureaucratic organization. ISM prevents us from confining ourselves to limited issues, such as structural aspect. Rather, it can take psychological topics into account, even environmental factors. The procedures for considering broad issues, discovering the sources of pathology and surfacing the most significant subsystems which aggravate the state of an organization are discussed in the next chapter.

8.5 The Framework of Applying IM

ISM is employed to implement the induction phase portrayed in Figure 2-3. Its objective is to verify the derived claims in forgoing chapters. Although ISM is applied to demonstrate the validity of the hypothesis of this thesis, it can be seen as an inception of another exploration. That is, it establishes new hypotheses. Take election as an example. The poll company relies on the voting result to verify its prediction of who will be the next president. But, for the civilians the voting result is a hypothesis. They wish the new president performed well in his term of office.

The proposed framework is shown as Figure 8-3. Having conformed to the forgoing listed criteria; the IM mechanism receives inputs from the derived claims, such as organization possessing multiple properties, and to verify the validity of these arguments. The verification procedure is a corroboration of man with man or multiplicative corroboration (see Chapter 2.5). It is empirical observation proceeded by theoretical arguments. In the theoretical argument, this study delineates a draft of bureaucratic problems. In the induction phase, IM serves as a mechanism to unveil the pathological pattern in terms of a more plain form.

In the framework several feedback loops are designed, which allow the group to reconsider the preliminary result and make necessary changes. The first step is preparation phase. During preparation phase, several activities are undertaken (refer to Warfield, 1994b, p. 127). They are:

(1) Scope statement - Its objective is to describe the context of a situation in order to extract the aspects directly relevant to the session.
(2) Outcome sought – It is to seek the definition of outcome. For instance, for the purpose of this study, discovering the pathological pattern (problematique) of bureaucratic organization is required in order to further improve organization performance.
(3) Triggering question – It is to decide a question to stimulate the generation of ideas. The triggering question is formulated through the collaboration of IM planner,

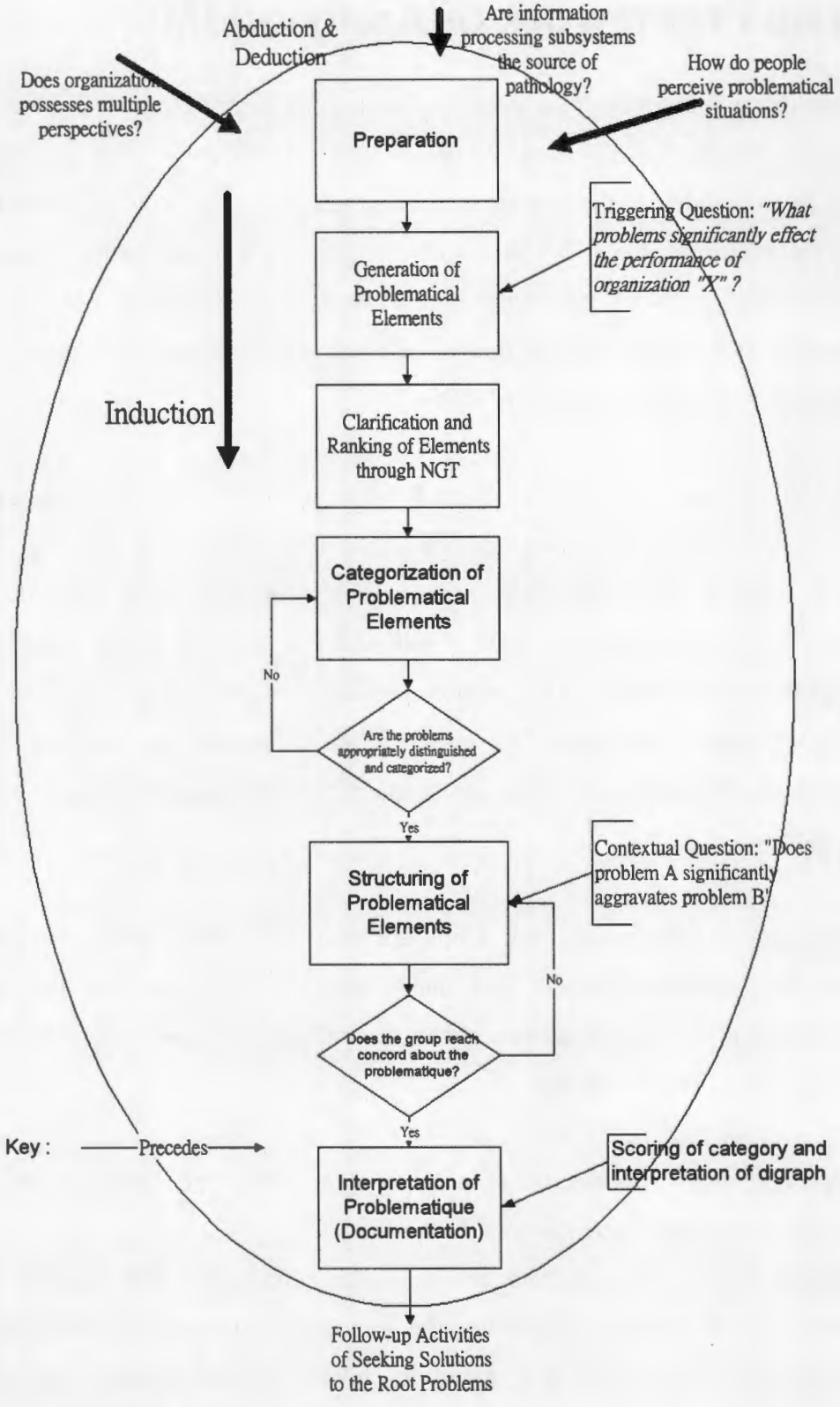


Figure 8-3: The Framework of Diagnosing Organization Pathology

experiential clients and the broker.

(4) Generic question – It is to decide a generic question which is apposite to identify whether a relation exist between two elements.

(5) Workshop location – It is to choose a suitable place for conduction the workshop. The location should have space for posting flip chart, projecting computer monitor, well arranged seats for the participants to discuss an issue and so forth.

(6) Participants – It is to select the relevant participants who are going to participate in the IM session to produce the sought outcome. In addition, the facilitator and computer operator are selected to facilitate the IM session.

In regard to the participants, it is vital to decide who should be involved in the design and the scope of involvement. For example, building a nuclear power plant is a hard decision. If the communities around the nuclear power plant are selected to involve in the decision, the opposing are overwhelming majority because the people are unbeneficial group. They concern more on their health than on sufficient electricity to the state. If the decision is made by all of the people in the country, most people might support building a nuclear power plant because they are beneficial group. The nuclear power plant is far from them, they concern more on sufficient electricity than on health. It is unfair to the minority if decision is made by all people of the country. Furthermore, if a large scale of involvement is commenced, we have to invest tremendous time and money. For this study, the primary concern is pathology inside bureaucracy. Though the outside people may contribute to discover the problem, owning to limited resources, the demonstration involves three groups of stakeholders in a government agency. This will be introduced in Chapter 9.

During preparation phase, the clients will get acquainted with the IM session, such as the sequence of steps, and realize the uncertainty of the process and produced result. The client has responsibility to make a determination whether IM will be used or not. Once it is approved, we can proceed to the next phase to start the session.

The session is triggered by a triggering question. The question motivates the group's brainstorming for generating the problems that provoke the unsteady state of an organization. The produced elements might be unclear or duplicated. They have to be

clarified in order to eliminate the duplication and to rephrase the problems that are not appropriately stated. Through the clarification, the group can establish shared understanding of the generated problems. Then, we apply NGT to rank the proposed problems and to select the influential elements for building a pathological model. The elements that do not receive any vote are excluded from the structuring. Theoretically, we can use all the generated elements to build the pathological model. However, practically, the large number of elements entails a large number of communications that are required during the ISM procedure. Essentially, the excluded elements are not as important as the elements that receive vote(s). Therefore, it is reasonable to filter the unimportant elements to save significant time.

The succedent steps of NGT are to categorize the elements and structure the elements. Categorization is an activity that attempts to classify the elements in terms of the similar attributes that they posses. It implies assigning the elements to the subsystems that they belong to. The subsystems of this research mean the 19 critical subsystems and the people issue. Usually, the preliminary result is a rough categorization. However, it provides the group with a base for further elaboration to generate refined categories. The computer has the function of creating a new category or of reassigning the elements to a new category, instead of an iterative posing of the question, as stated in Chapter 8.3.

The step of generating the structure of problematical elements is based on ISM. The algorithm of ISM is briefly introduced in Appendix A. The product of this step is a problematique digraph that helps us to focus on certain subsystems in order to take action to remedy the existing unsteady state. The element(s) of antecedent to the 'sink' of problems are considered as the causes of the problems. In some way, they are the sources of pathology. However, we should not rely on only the interpretation of elements. We should combine the scoring result of category to obtain a more comprehensive picture. In addition, the produced digraph is not unalterable. The change is dependent on the participants. Through reviewing the generated model, the participants might want to make some rectification. The computer can retrieve the elements and their connected elements to change the answer that has been made. By changing the answer, we will generate a new digraph. The process can be iterative until the group reaches concord on

the result.

The interpretation of the generated model is based on the scoring. Each element can be scored according to its position in the digraph. Besides, the digraph will show the number of elements, which are antecedent or succedent to an interested element. The scoring result provides several criteria for evaluating each element and subsystem. The produced categories (subsystems) are scored by combining the score of its element(s). The score result can reflect the subsystems that cause the most serious organization pathology. The method of scoring will be illustrated in the next chapter (the case study of applying the framework to diagnose the pathology of the City of Tygerberg).

The stakeholders' consensus is a prescription for healing an organization. It provides the direction of taking actions to solve the problems and to improve organization performance. However, we have continuously to observe the implementation outcome and the state of organization for determining whether a new IM session should be conducted. If it is necessary to conduct a new IM session, we follow the same process portrayed in Figure 8-3 to conduct IM workshops. If the proposed follow-up actions restore an organization to a desirable state, no further intervention is required.

The proposed framework attempts to surface organization problems, which are embedded in people's minds, through an interactive approach to achieve consensus. The process is grounded in both logic and agreement. Furthermore, the framework strives to cope with complexity through group effort. The application of the framework is in the South African bureaucratic context. The next chapter is about a case study where the framework is applied to diagnose one of South Africa's biggest cities – the City of Tygerberg.

Chapter 9 Diagnosis of One of South Africa's Biggest Cities – the City of Tygerberg

This chapter is about the application of the proposed framework to a South Africa local government. The application aims at seeking the pathological pattern of the South African bureaucratic context. The studied organization is one of the biggest local governments of South Africa (the City of Tygerberg in Cape Town). The City of Tygerberg is striving to improve its organization performance in order to achieve a successful transition. The application attempts to help the City of Tygerberg to pinpoint its current problems, which negatively impact on its performance. We will, first, give a brief overview of South African local government in general and then of the City of Tygerberg. Second, we will outline the research results and interpret the findings.

9.1 The Background of South African Local Government

In 1948, South Africa introduced *apartheid*, which instituted strict residential segregation and the compulsory removal of black people to 'own group' areas. Through spatial separation, influx control, and a policy of 'own management for own area', *apartheid* aimed to limit the extent to which affluent white municipalities would bear the financial burden of servicing disadvantaged black areas. *Apartheid* regulations barred most retail and industrial developments in black areas. This limited the tax base and forced residents and retailers to spend most of their money in white areas. Moreover, in rural areas, discrimination and segregation were equally stark. Water and electrification were supplied to white residents in rural areas at enormous cost, while scant regard was given to the needs of the rural black majority. All of these factors caused inevitable crisis and collapse (see the White Paper on Local Government, 1998).

In 1984, an uprising shocked the foundation of the *apartheid* order. As the uprising

gathered momentum, civics and other black community bodies started to organize. Their chief weapons were the organized boycott of rents and service charges, and consumer boycotts. For the first time people began to protest systematically against the way human settlements were spatially and economic distorted. The crisis opened up by the collapse of the *apartheid* local government system eventually led to the realization that a new deal was needed. It was a major factor leading to the national reform process that began in 1990. National debate about the future of local government took place in the Local Government Negotiating Forum, alongside the national negotiating process. The Local Government Negotiating Forum framed the Local Government Transition Act (LGTA), which sketched a process for change. The LGTA mapped out three phases of transition:

(1) The pre-interim phase, which prescribed the establishment of local forums to negotiate the appointment of temporary councils, which would govern until the municipality elections.
(2) The interim phase, beginning with municipal elections and lasting until a new local government system had been designed and legislated upon.
(3) The final stage, when a new local government system would be established.

At present, South African local government is in the interim phase. The LGTA has deracialized the system of local government through the amalgamation of former racially-based structures. The amalgamation entails increasing complexity within local government. The challenge, on the one hand, is to distribute efficiently the resources to develop certain areas. On the other hand, the amalgamation brings about the challenge for efficient administration, which can be hampered, owing to diversified cultures and the functions of each municipality. The tasks and the required functions for local governments are prescribed in the South Africa constitution.

The constitution of the Republic of South Africa, published in 1996, defines the role of local government:

(1) The objectives of local government are –
    (a) to provide democratic and accountable government for local communities;

(b) to ensure the provision of services to communities in a sustainable manner;
(c) to promote social and economic development;
(d) to promote a safe and healthy environment; and
(e) to encourage the involvement of communities and community organizations in the matters of local government.

(2) A municipality must strive, within its functional and administrative capacity, to achieve the objects set out in subsection (1).

The objectives indicate that democracy (humanity), economic development, service delivery, the addressing of environmental needs and the designing of capable functions and administrations are important requirements. The constitution implicitly indicates that local government has been perceived as an open system. It has to take environment into account during policy formulation. Its management activities must be participative. It has to focus its function and administration capacity in order to achieve the stated objectives, which are towards the prosperity of whole areas, rather than of a particular area. The constitution prescribes the objectives that should be achieved during the transition of South African local government.

On the other hand, the constitution outlines the development duties of municipality:

(1) to structure and manage its administration and budgeting and planning processes to give priority to the basic needs of the community, and to promote the social and economic development of the community; and
(2) to participate in national and provincial development programs.

The responsibilities prescribe crucial tasks that have to be fulfilled by local government; i.e., prioritization of resources and the provision of competent administration and structure to deliver service in a sustainable manner. For achieving the objectives and duties, The White Paper on Local Government (issued by the Ministry for Provincial Affairs and Constitutional Development in March 1998) outlines the policies for guiding local government activities. The policies point out the characteristics of development: maximizing social development and economic growth, integrating and coordinating,

democratizing development, empowering and distributing, leading and learning. The developmental characteristics show the requirement for economic development, communication within organization and inter-organization, and a humanity-based decentralization system. Finally, local government must be able to adapt to environmental change and be able to learn. Thus the direction of transformation for a local government is highlighted, i.e., towards an adaptive living system.

As the constitution and white paper prescribe, local government, on the one hand, has to deal with the transition of the merging of municipalities, which have different cultures, paradigms and levels of economic development. On the other hand, it has to interact with its suprasystems and internal stakeholders to set up priorities for establishing efficient and effective organization structure and administration system. The missions manifest the present complex situation of the local governments and the obstacles that they have to surmount. They face the problems of 'what to do' and 'how to do' for meeting the requirements. This question have motivated the local governments to seek approaches to prioritize and utilize their resources in a more efficient way. A brief introduction to the current situation of one of the biggest local governments – the City of Tygerberg - may manifest the challenges that face South African local government during the transition period of South Africa.

9.2 The Situation of The City of Tygerberg

The City of Tygerberg was formed in 1996 through the amalgamation of 13 municipalities in Cape Town, stretching from Durbanville in the North, Khayelitsha in the South, Bellville in the East and Goodwood in the West. The creation of the City of Tygerberg brought together distinctly diverse communities, consisting of the poorest of the poor to the more stable middle- and higher-income families. There are large Muslim and Christian religious groupings and an equal split between the two main political groupings of the African National Congress (ANC) and the National Party (NP). These features manifest that the City of Tygerberg consists of diversified cultures, discrepant infrastructures and a wide scope of social status. In order to deliver service to the diverse communities, the local government is functionally divided into six directorates, each

headed by a Chief Executive Officer. The six directorates are:

(1) Civil Engineering
(2) Finance
(3) Corporate Services
(4) Electrical Services
(5) Urban Planning and Economic Development
(6) Community Services

Some departments are comprised of deep structure. For example, there are 10 strata in the community service division and the number of posts within it is about 3,400. In total, the executive team of the City of Tygerberg is supported by almost 6,000 employees. Subjected to the Constitution of South Africa (1996), improvement of the City of Tygerberg's performance is fundamentally important. The management team strives to set up strategies to enable the organization to 'do the right things' and to 'do the things right'. But improvement of such a big organization's efficiency and effectiveness during the complex transition process are harsh challenges for the directorates of the City. What should be done first? How should resources be prioritized to improve efficiently the performance of the City? These sorts of questions are challenging the managers.

The next section is about the application of the method portrayed in Chapter 8, to help the City of Tygerberg to identify its problems (pathology) in order to improve performance. The application also helps the City of Tygerberg to identify 'what to do first' in prioritizing its resources.

9.3 The Diagnosis of The City of Tygerberg

We submitted a proposal on 1998-10-5 for diagnosing the organization pathology of the City of Tygerberg. Meanwhile, a first stage meeting took place for introducing IM and LST to the clients. During the meeting the sought outcome, required resources, triggering question and the relevant participants were also discussed. The Corporate Management Team (CMT) of the City reviewed the proposal and decided the idea was helpful to the

City of Tygerberg to improve performance by identifying problems first. Hence, the CMT approved the proposal on 1998-10-21. The project was started on 1998-11-10 and completed on 1998-12-15.

Three groups of participants were selected for these Interactive Management (IM) workshops. The three groups were:

Operational group - post level 20-15
Supervisory group - post level 10 –07
Top Management group - post level 4 - 1

The operational group comprised 11 participants and the workshop was conducted on 10, 11 and 13 November, 1998. The supervisory group comprised 9 participants and the workshop was conducted on 17 and 19 November, 1998. The top management group comprised 7 participants and the workshop was conducted on 8 and 15 December, 1998.

The Operational Group:

The operational group posed a total of 38 problematical elements that negatively influenced the performance of the City of Tygerberg. Through Nominal Group Technique (NGT), 28 elements were selected out of 38 problematical elements. The 28 elements were ranked and the result showed that '*poor two-way communication*' obtained the highest rank among the selected elements (see Table 9-1). The 28 selected elements were further 'preliminary categorized' into 5 categories. The generated categories were *communication, training development, policies, team-building* and *man, change diversity* (see Table 9-2).

Through Interpretative Structural Modeling (ISM), the operational group further structured the problematique. The structured model, shown as Figure 9-1, reveals that '*general bad management practice*' was the root problem.

The Supervisory Group

The supervisory group posed a total of 38 problematical elements that negatively influenced the performance of the City of Tygerberg. Through NGT, 24 elements were

Table 9-1: Problematical elements posed by the operational group and the ranking result through Nominal Group Technique (NGT)

	PROBLEMS	RANK1	RANK2	RANK3	RANK4	RANK5	VOTES
1	POOR TWO WAY COMMUNICATION	4		1	1	1	7
2	AVAILABILITY OF PEOPLE(LOW PRIORITY ON TRAINING AND DEVELOPMENT)		1	1	2		4
3	POLICIES(NO COHERENT POLICIES)		1	1	1		3
4	UNPROFESSIONALISM IN DEALING WITH EMPLOYEES PROBLEMS			3			3
5	LACK OF SHARING AND FLOW OF INFORMATION		1		1	1	3
6	GENERAL BAD MANAGEMENT PRACTICE		1		1	1	3
7	UNCLEAR COMMUNICATION	2					2
8	INTER WORKER RELATIONSHIP		1	1			2
9	UNEVEN, INADEQUATE HUMAN RESOURCES	2					2
10	EMPLOYEE HAS NO OPPORTUNITY TO SHOW FULL POTENTIAL			1		1	2
11	INAPPROPRIATE MANAGEMENT STYLE FOR CURRENT CONDITION				2		2
12	LACK OF CAREER PATH EMPLOYEE DEVELOPMENT IN CERTAIN JOB/WORK AREAS		2				2
13	NO FULL POTENTIAL DEVELOPMENT / CAREER PATH			1	1		2
14	POOR GENERAL WORKER'S FACILITIES		1		1		2
15	INCREASE SCOPE OF WORK WITHOUT INCREASES OF RESOURCES		1			1	2
16	STRUCTURAL COMMUNICATION(INTERDEPARTMENTAL AND LONG LINE COMMUNICATION)	1					1
17	PARTICIPATIVE MANAGEMENT (SLOW IN ACHIEVING RESULTS)			1			1
18	AFFIRMATIVE ACTION (INCOMPETENCE RELATED)					1	1
19	AFFIRMATIVE ACTION(LIP SERVICES)					1	1
20	RESOURCES (UNEVENLY DISTRIBUTE/INADEQUATE FACILITY RESOURCES)		1				1
21	POOR TIME MANAGEMENT					1	1
22	CONFLICTING ORGANIZATIONAL AND INDIVIDUAL INTEREST		1				1
23	IGNORANCE TO SUBORDINATE VIEWS/PROBLEMS			1			1
24	NEPOTISM-BIASED RECRUITMENT APPROACH BASED ON NEOPOTISN AND FAVOURTISM	1					1
25	LACK OF CUSTOMER ORIENTATION				1		1
26	NO RECREATION AND SPORT FACILITIES					1	1
27	UNSAFE EXTERNAL WORKING ENVIRONMENT	1					1
28	FRAUD AND CORRUPTION					1	1
29	AFFIRMATIVE ACTION(GREAT EXPECTATION)						
30	TOO SCARED TO DELEGATE(POOR DELEGATION)						
31	INSUFFICIENT FOCUS ON REVENUE COLLECTION TASK						
32	THE PREPAID METER SYSTEM DOES NOT SOLVE THE ARREAR SERVICES						

33	WORK ENVIRONMENT DO NOT COMPLY WITH OH&SA REGULATION						
34	INCONSISTENT APPLICATION OF LABOR POLICY						
35	NO CULTURE OF SELF-STARTING APPROACH						
36	INCONSISTENT LABOR SERVICE CONDITION						
37	LACK OF ACKNOWLEDGEMENT OF WORKER ACHIEVEMENT						
38	LACK OF MUTUAL TRUST AND CORPORATION						

Table 9-2: Preliminary category of problematical field categorized by operational group

COMMUNICATION		TRAINING DEVELOPMENT	POLICIES	TEAM BUILDING	MAN CHANGE, DIVERSITY
POOR TWO WAY COMMUNICATION(1)	POOR TIME MANAGEMENT(21)	AVAILABILITY OF PEOPLE (LOW PRIORITY ON TRAINING AND DEVELOPMENT)(2)	POLICIES (NO COHERENT POLICY) (3)	INTER WORKER RELATIONSHIP (8)	INAPPROPRIATE MANAGEMENT STYLE FOR CURRENT CONDITION (11)
UNPROFESSIONALISM IN DEALING WITH EMPLOYEE PROBLEMS(4)	CONFLICTING ORGANIZATIONAL AND INDIVIDUAL INTEREST(22)	UNEVEN INADEQUATE HUMAN RESOURCES(9)			POOR GENERAL WORKER FACILITY (14)
LACK OF SHARING AND FLOW OF INFORMATION(5)	IGNORANCE TO SUBORDINANTS' NEED (23)	LIMITED OPPORTUNITY TO SHOW POTENTIAL(10)			
GENERAL BAD MANAGEMENT PRACTICE(6)	NEOPTISM – BIASED RECRUITMENT(24)	LACK OF CAREER PATH AND EMPLOYEE DEVELOPMENT (12)			
UNCLEAR COMMUNICATION(7)	LACK OF CUSTOMER ORIENTATION(25)	INCOMPETENT AFFIRMATIVE ACTION APPOINTMENTS (18)			
NO POTENTIAL DEVELOPMENT / CAREER PATH(13)	LACK OF RECREATIONAL AND SPORT FACILITY(26)	LIP SERVICES TO EMPLOYMENT EQUITY(19)			
SCOPE OF WORK INCREASE WITHOUT INCREASED RESOURCES(15)	UNSAFE EXTERNAL WORK ENVIRONMENT(27)				
STRUCTURAL COMMUNICATION PROBLEMS(16)	FRAUD AND CORRUPTION(28)				
INEFFICIENT PARTICIPATIVE MANAGEMENT(17)					
UNEVEN/INADEQUATE RESOURCE ALLOCATION(20)					

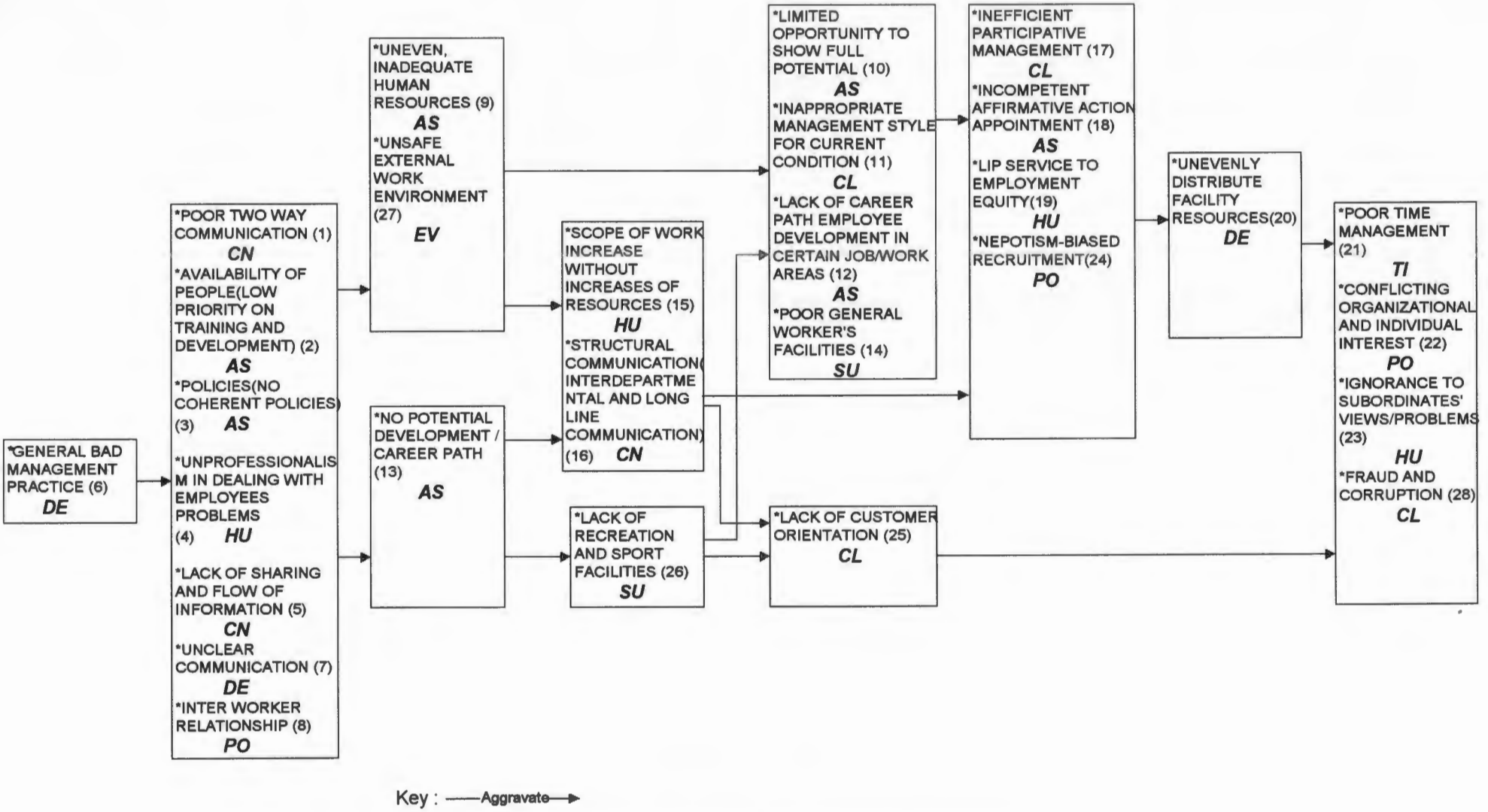


Figure 9-1: The Problematique Structured by the Operational Group

selected out of 38 problematical elements for study. The 24 elements were ranked. The result showed that 'budget constraint', 'staff shortage', 'ineffective communication', 'lack of responsibility and motivation' and 'lack of participative management' received the highest rankings (see Table 9-3). Using the software's category function, the group 'preliminary categorized' the problematical elements into 6 categories. The 6 categories were *resources*, *management*, *service condition*, *union actions*, *discipline* and *career opportunity*. The detail of each category is shown as Table 9-4.

Through Interpretative Structural Modeling (ISM), the supervisory group further structured the problematique. The structured model is shown as Figure 9-2. It reveals that '*budget constraint*' is the root problem.

Top Management Group

The top management group posed a total of 44 problematical elements. Through NGT, 24 elements were selected out of 44 problematical elements for structuring the problematique. The 24 elements were ranked. The ranking result showed that 'absence of performance management system' and 'lack of strategic/cooperative direction and focus on CMT on the way forward' received the highest ranking (see Table 9-5). Using the software's category function, the top management group categorized the problematical elements into 4 categories. The four categories were *corporate system*, *political environment*, *labour relationship* and *visionary leadership*. The detail of each category is shown as Table 9-6.

Through Interpretative Structural Modeling (ISM), the top management group further structured the problematique. The structured model is shown as Figure 9-3. It reveals that '*lack of strategic/cooperate direction and focus on CMT on the way forward*' is the root problem.

Elaboration of preliminary categories

The preliminary categories produced by the three groups of participants were further elaborated by the project team.

Table 9-3: Problematical elements posed by supervisory group and the ranking result through NGT

	PROBLEM	RANK1	RANK2	RANK3	RANK4	RANK5	VOTES
1	BUDGET CONSTRAINT	2	2				4
2	STAFF SHORTAGE	1	2			1	4
3	INEFFECTIVE COMMUNICATION		2			2	4
4	LACK OF RESPONSIBILITY AND MOTIVATION		1		2	1	4
5	LACK OF PARTICIPATIVE MANAGEMENT	2	1			1	4
6	INEFFECTIVE ORDERING PROCESS			1	1		2
7	LACK OF COOPERATION			1		1	2
8	LACK OF UNIFORM SERVICE CONDITION			2			2
9	UNAVAILABILITY OF SENIORS IN TIME OF NEED				1	1	2
10	ROLE CONFUSION- OVERLAP OF DUTY AND RESPONSIBILITY			1	1		2
11	LACK OF DELEGATED ACCOUNTABILITY	1			1		2
12	INEFFECTIVE COMMUNICATION OF PROCEDURES AND GUIDELINES	1		1			2
13	NO UNIFORM POLICIES		1		1		2
14	VEHICLE SHORTAGE AND RESPONSE TIME FOR VEHICLE REPAIRS	1					1
15	RESISTANCE TO CHANGE(EMPLOYEES' RESISTANCE TO CHANGES)	1					1
16	NEGATIVE INFLUENCE OF UNION ACTIONS					1	1
17	LACK OF SELF-DISCIPLINE			1			1
18	LACK OF PERFORMANCE MANAGEMENT SYSTEM			1			1
19	LACK OF RESOURCES (EQUIPMENT)				1		1
20	INCOMPETENT PERSONNEL					1	1
21	MISUNDERSTANDING COMMUNICATION (DIVERSIFIED LANGUAGE)				1		1
22	LIMITED CAREER OPPORTUNITY			1			1
23	POOR COORDINATION ON SEMINAR, MEETING AND WORKSHOP						
24	INSUFFICIENT AND TIMEOUS COMPUTER SOFTWARE TRAINING						
25	CENTRALIZED SALARY AND WAGE OFFICE						
26	UNFAIR DEADLINE FOR FORWARDING INFORMATION						
27	POLITICAL INTERVENTION						
28	UNSAFE AND HIGH CRIME ENVIRONMENT						
29	LEGAL CONSTRAINT						
30	UNCONTROLLED URBANIZATION						
31	TASKS ARE NOT GOAL ORIENTED						
32	UNCLEAR INSTRUCTIONS						
33	DIVERSIFIED CULTURES						
34	BUREAUCRATIC PROCEDURES						
35	CULTURE OF NON-PAYMENT						
36	POLITICAL UNCERTAINTY						
37	LACK OF UNDERSTANDING OF CHANGES						
38	INTOLERANCE BETWEEN WORKERS						

Table 9-4: Preliminary category of problematical field categorized by supervisory group

RESOURCES	MANAGEMENT	SERVICE CONDITIONS	UNION ACTIONS	DISCIPLINED	CAREER OPPORTUNITY
BUDGET CONSTRAINT (1)	INEFFECTIVE COMMUNICATION (3)	LACK OF UNIFORM SERVICE CONDITION (8)	NEGATIVE INFLUENCE OF UNION ACTIONS (16)	LACK OF SELF-DISCIPLINE (17)	LIMITED CAREER OPPORTUNITY (22)
STAFF SHORTAGE (2)	LACK OF RESPONSIBILITY AND MOTIVATION (4)				
VEHICLE SHORTAGE AND RESPONSE TIME FOR VEHICLE REPAIR (14)	LACK OF PARTICIPATIVE MANAGEMENT (5)				
LACK OF RESOURCES (EQUIPMENT) (19)	INEFFECTIVE ORDERING PROCESS (6)				
INCOMPETENT PERSONNEL (20)	LACK OF COOPERATION (7)				
	UNAVAILABILITY OF SENIORS IN TIME OF NEED (9)				
	ROLE CONFUSION-OVERLAP OF DUTY AND RESPONSIBILITY (10)				
	LACK OF DELEGATED ACCOUNTABILITY (11)				
	INEFFECTIVE COMMUNICATION OF PROCEDURES AND GUIDELINES (12)				
	NO UNIFORM POLICIES (13)				
	RESISTANCE TO CHANGE(EMPLOYEES' RESISTANCE TO CHANGES) (15)				
	LACK OF PERFORMANCE MANAGEMENT SYSTEM (18)				
	MISUNDERSTANDING COMMUNICATION (DIVERSIFIED LANGUAGE) (21)				

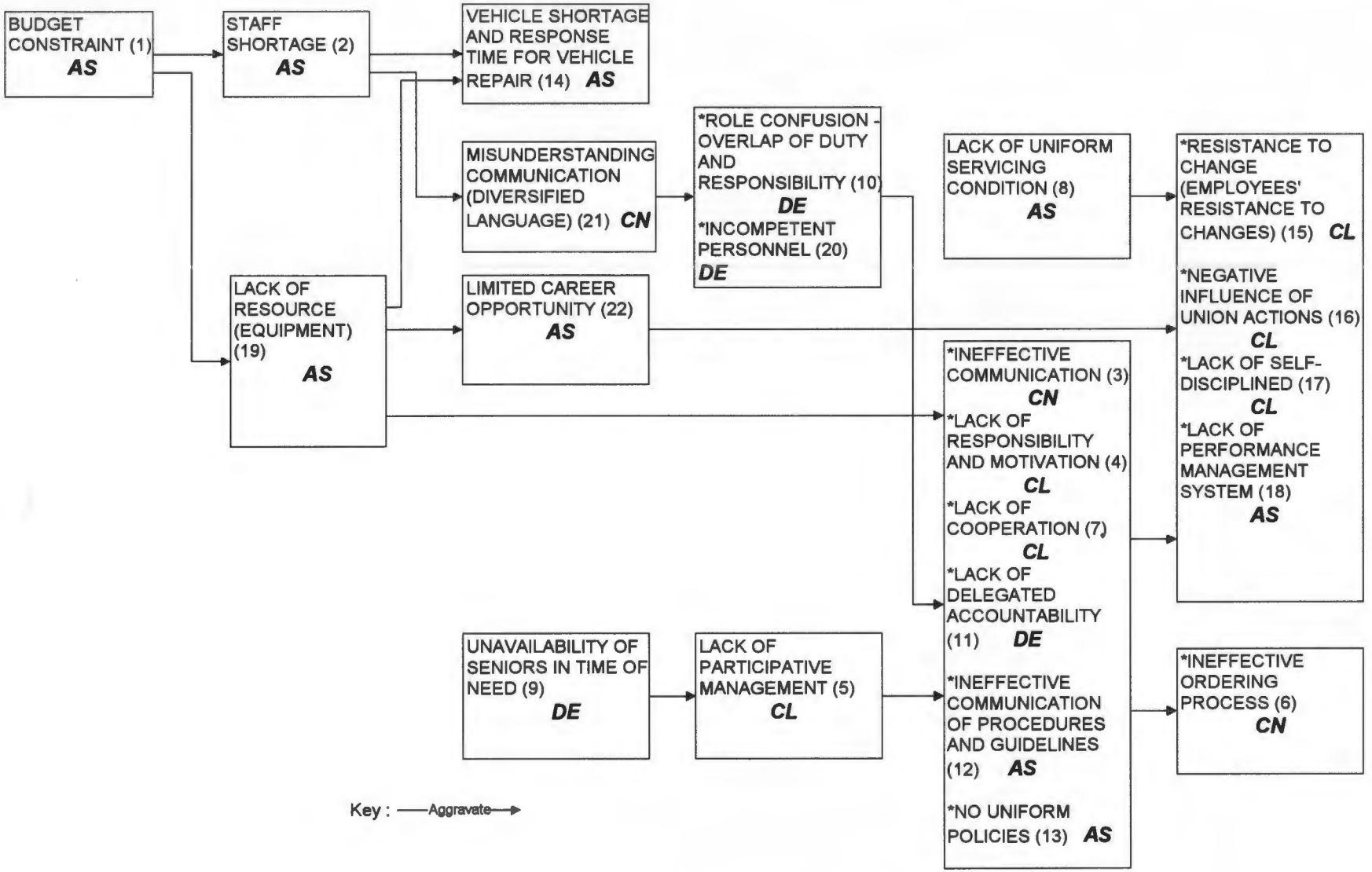


Figure 9-2: The Problematique Structured by Supervisory Group

Table 9-5: Problematical elements posed by top management group and the ranking result through NGT

	PROBLEM	1	2	3	4	5	6	7	8	VOTES
1	ABSENCE OF A PERFORMANCE MANAGEMENT SYSTEM	1	1		1	1				4
2	LACK OF STRATEGY/CORPORATE DIRECTION AND FOCUS FROM CMT ON THE WAY FORWARD	2	2							4
3	LACK OF A 5 YEAR FINANCIAL PLAN OR STRATEGY – UNCLEAR BUDGETING OR FINANCIAL PERFORMANCE PARAMETERS			1	1		1			3
4	CULTURE OF NONPAYMENT			1				1	1	3
5	OUTDATED JOB EVALUATION SYSTEM					1			1	2
6	ANTAGONISTIC/COMPETITIVE RELATIONSHIP WITH UNION (STRIKES & UNRESOLVED DISPUTES)					1	1			2
7	LACK OF A STRATEGIC CHANGE MANAGEMENT PLAN OR PROCESS						1	1		2
8	INADEQUATE FINANCIAL RESOURCES	2								2
9	FIRST LINE MANAGERS NOT EMPOWERED TO HANDLE THE DEMANDS OF A CHANGING ENVIRONMENT							1	1	2
10	LACK OF WORK ETHICS				1			1		2
11	A LACK OF STRATEGIC CAPACITY AT THE CORE OF ORGANIZATION			1						1
12	RIGID CONDITIONS OF SERVICE							1		1
13	POOR CROSS-FUNCTIONAL COORDINATION AND PROCESS MANAGEMENT				1					1
14	LACK OF EMPLOYMENT EQUITY PLAN						1			1
15	NOT EMPOWERING OFFICERS TO DELIVER SERVICE (LACK OF DELEGATION)						1			1
16	UNPRODUCTIVE WORKFORCE					1				1
17	ATTITUDE OF SOME OF THE PERSONNEL TOWARDS THEIR WORK AND SERVICE DELIVERY			1						1
18	LACK OF PRIORITISATION OF KEY ISSUES		1							1
19	LACK OF UNIFORM POLICIES AND PROCEDURES		1							1
20	TOO MANY MEETING / WORKSHOPS WHICH DELIVER NOTHING								1	1
21	LACK OF TRUST (POLITICS – INTERNAL AND EXTERNAL)					1				1
22	PRESENT COMMITTEE SYSTEM: DUPLICATION AND LACK OF CO-ORDINATION, LONG DECISION MAKING PROCESS								1	1
23	POOR TIME AND ATTENDANCE MANAGEMENT			1						1
24	LACK OF MANAGEMENT INFORMATION SYSTEM		1							1
25	INCREMENTAL BUDGETING SYSTEM									
26	DEPARTMENTALISTIC BUDGETING PRIORITY									
27	LINE ITEM BUDGETING SYSTEM									
28	A RIGID POST HIERARCHY									
29	LACK OF AGREEMENT ON DECENTRALIZATION OF SERVICES									
30	INABILITY TO IMPLEMENT THE DECENTRALIZED MODEL									
31	LACK OF A PROGRAMME TO MANAGE CULTURAL DIVERSITY									
32	LACK OF CO-OPERATION AMONGST SOME OF THE DIRECTORS									
33	LONG LEAD TIMES TO ACCESS CAPITAL									
34	DEMOTIVATED STAFF/ NEGATIVE ORGANIZATION CLIMATE									
35	RESISTANCE TO CHANGE									
36	LACK OF IMCOME GENERATING STRATEGY									
37	UNREALISTIC EXPECTATIONS OF STAFF									
38	TOO MUCH RED TAPE									
39	ENDLESS "COMMUNITY CONSULTATION" WHICH RESULTS IN DEMANDS BEING MADE UPON THE MUNICIPALITY									
40	INEFFECTIVE COMMUNICATION WITH THE COMMUNITY									
41	UNCERTAINTY ABOUT FUTURE METROPOLITAN LOCAL GOVERNMENT STRUCTURES (UNICITY) INHIBITS LONG TERM VISION BEING FORMULATED AND LEADS TO DEMOTIVATION AMONGST STAFF									
42	FUNCTION ROLE UNCERTAINTY AMONGST DIRECTORS									
43	REMNANTS OF CHAOTIC ADMINISTRATION FROM CERTAIN FORMER ADMINISTRATIONS NEEDS TO BE ADDRESSED									
44	INCONSISTENT DECISION MAKING									

Table 9-6: Preliminary category of problematical field categorized by top management group

CORPORATE SYSTEM	POLITICAL ENVIRONMENT	LABOUR RELATIONSHIP	VISIONARY LEADERSHIP
ABSENCE OF A PERFORMANCE MANAGEMENT SYSTEM (1)	CULTURE OF NONPAYMENT (4)	ANTAGONISTIC/COMPETITIVE RELATIONSHIP WITH UNION (STRIKES & UNRESOLVED DISPUTES) (6)	A LACK OF STRATEGIC CAPACITY AT THE CORE OF ORGANISATION (11)
LACK OF STRATEGY/CORPORATE DIRECTION AND FOCUS FROM CMT ON THE WAY FORWARD (2)	LACK OF TRUST (POLITICS – INTERNAL AND EXTERNAL) (21)		
LACK OF A 5 YEAR FINANCIAL PLAN OR STRATEGY – UNCLEAR BUDGETING OR FINANCIAL PERFORMANCE PARAMETERS (3)			
OUTDATED JOB EVALUATION SYSTEM (5)			
LACK OF A STRATEGIC CHANGE MANAGEMENT PLAN OR PROCESS (7)			
INADEQUATE FINANCIAL RESOURCES (8)			
FIRST LINE MANAGERS NOT EMPOWERED TO HANDLE THE DEMANDS OF A CHANGING ENVIRONMENT (9)			
LACK OF WORK ETHICS (10)			
RIGID CONDITIONS OF SERVICE (12)			
POOR CROSS-FUNCTIONAL COORDINATION AND PROCESS MANAGEMENT (13)			
LACK OF EMPLOYMENT EQUITY PLAN (14)			
NOT EMPOWERING OFFICERS TO DELIVER SERVICE (LACK OF DELEGATION) (15)			
UNPRODUCTIVE WORKFORCE (16)			
ATTITUDE OF SOME OF THE PERSONNEL TOWARDS THEIR WORK AND SERVICE DELIVERY (17)			
LACK OF PRIORITISATION OF KEY ISSUES (18)			
LACK OF UNIFORM POLICIES AND PROCEDURES (19)			
TOO MANY MEETING / WORKSHOPS WHICH DELIVER NOTHING (20)			
PRESENT COMMITTEE SYSTEM: DUPLICATION AND LACK OF CO-ORDINATION, LONG DECISION MAKING PROCESS (22)			
POOR TIME AND ATTENDANCE MANAGEMENT (23)			
LACK OF MANAGEMENT INFORMATION SYSTEM (24)			

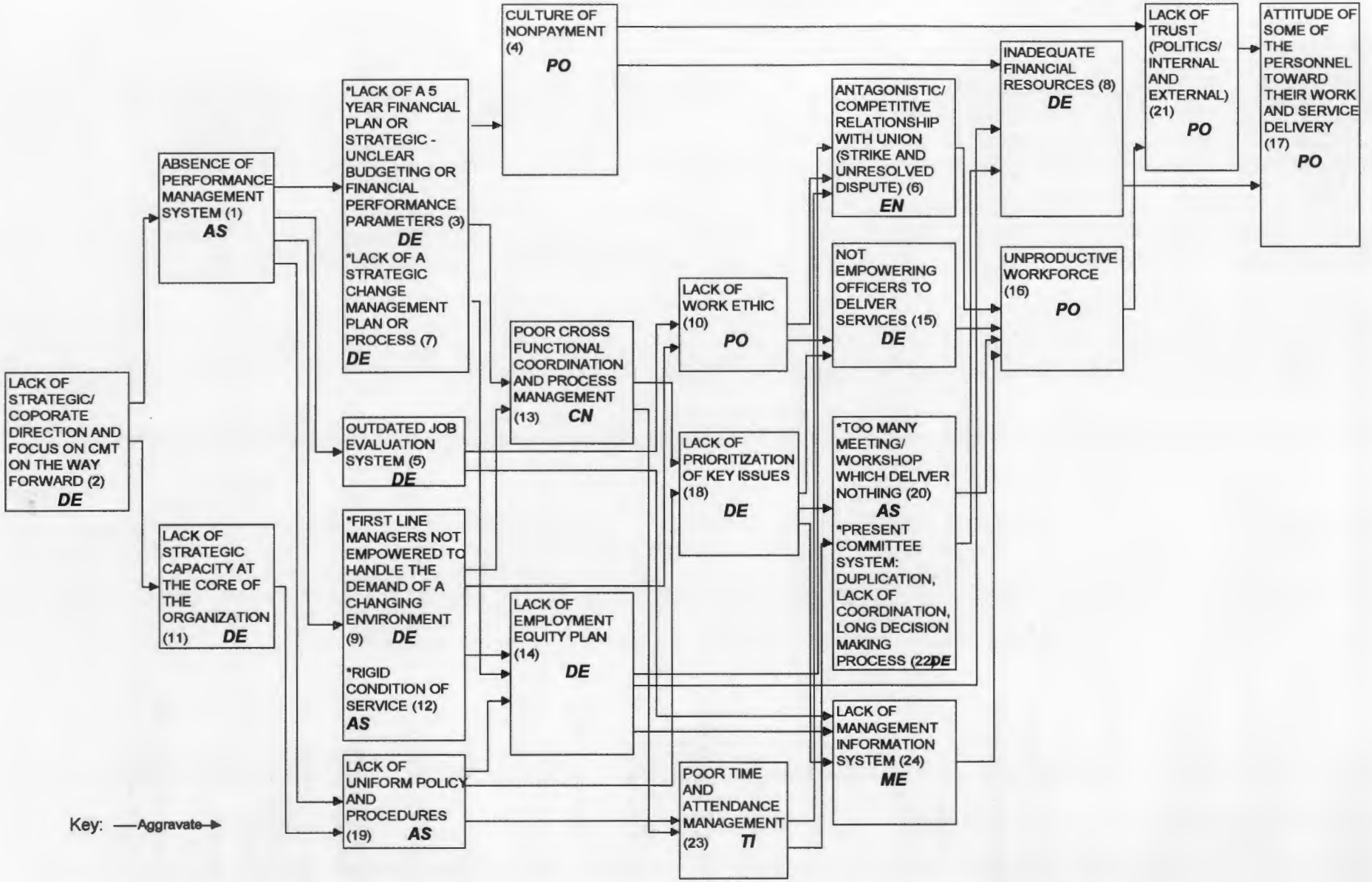


Figure 9-3: The Problematique Structured by Top Management Group

The elaborated categories are primarily grounded in the critical subsystems of a living system and in intangible human mental activities. The elaborated categories of an operational group are: *circulating information*, *associator*, *supporter*, *decider*, *timer*, *humanity*, *organization culture*, *conflict power politic* and *environment*. The elements of each category are shown as Table 9-7. A capital letter is added beside each problem of Figure 9-1, showing the problem category to which the problem belongs. The elaborated categories of the supervisory group are: *circulating information*, *associator*, *decider*, and *organization culture*. The detail of each category is shown as Table 9-8. A capital letter is added beside each problem of Figure 9-2, showing the problem category to which the problem belongs. Some of supervisor's problems should be given attention. The 'budget constraint' and 'lack of resource' and 'negative influence of union actions' seem relevant to the environment at first look. However, they are categorized into *associator* and *organization culture* respectively. This can be attributed to the fact that resource is not properly and efficiently utilized and distributed, rather than to insufficient revenue. The planning of resource distribution is the primary activity of *associator*. The influence of union actions has existed in the organization for a long time and it has gradually shaped people's way of life. The elaborated categories of the top management group are: *decider*, *associator*, *circulating information*, *timer*, *storing information*, *conflict power politic* and *labour relationship*. The elements of each category are shown as Table 9-9. A capital letter is added beside each problem of Figure 9-3, showing the problem category to which the problem belongs.

Scoring of Category

There are six scores used to interpret the result. They are position score, antecedent score, succedent score, activity score, net antecedent/succedent (A/S) score and net score respectively. Each problem can be assigned a 'position score'. The problems on the furthest left-hand side of the problematique diagram are assigned the highest scores Those on the furthest right-hand side are assigned the lowest scores. The intermediate problems lying in the middle of the diagram receive an appropriate position score.

The antecedent score (to the left) represents the number of problems that aggravate the stated problem. Similarly, the succedent score (to the right) represents the number of

Table 9-7: The elaborated categories of operational group

CIRCULATING INFORMATION *(CN)*	ASSOCIATOR *(AS)*	SUPPORTER *(SU)*	DECIDER *(DE)*	TIMER *(TI)*	HUMANITY *(HU)*	ORGANIZATION CULTURE *(CL)*	CONFLICT, POWER, POLITIC *(PO)*	ENVIRONMENT *(EV)*
POOR TWO WAY COMMUNICATION (1)	AVAILABILITY OF PEOPLE (LOW PRIORITY ON TRAINING AND DEVELOPMENT)(2)	POOR GENERAL WORKER FACILITY (14)	GENERAL BAD MANAGEMENT PRACTICE(6)	POOR TIME MANAGEMENT(21)	UNPROFESSIONALISM IN DEALING WITH EMPLOYEE PROBLEMS(4)	INAPPROPRIATE MANAGEMENT STYLE FOR CURRENT CONDITION (11)	INTER WORKER RELATIONSHIP (8)	UNSAFE EXTERNAL WORK ENVIRONMENT (27)
LACK OF SHARING AND FLOW OF INFORMATION(5)	POLICIES (NO COHERENT POLICY) (3)	RECREATIONAL AND SPORT FACILITY(26)	UNCLEAR COMMUNICATION (7)		SCOPE OF WORK INCREASE WITHOUT INCREASED RESOURCES(15)	INEFFICIENT PARTICIPATIVE MANAGEMENT (17)	CONFLICTING ORGANIZATIONAL AND INDIVIDUAL INTEREST(22)	
STRUCTURAL COMMUNICATION PROBLEMS(16)	UNEVEN INADEQUATE HUMAN RESOURCES(9)		UNEVEN/INADEQUATE RESOURCE ALLOCATION(20)		LIP SERVICES TO EMPLOYMENT EQUITY(19)	LACK OF CUSTOMER ORIENTATION(25)	NEOPTISM – BIASED RECRUITMENT(24)	
	LIMITED OPPORTUNITY TO SHOW POTENTIAL(10)				IGNORANCE TO SUBORDINANTS' NEED (23)	FRAUD AND CORRUPTION (28)		
	LACK OF CAREER PATH AND EMPLOYEE DEVELOPMENT (12)							
	NO POTENTIAL DEVELOPMENT / CAREER PATH(13)							
	INCOMPETENT AFFIRMATIVE ACTION APPOINTMENTS (18)							

Table 9-8: The elaborated categories of managerial group

CIRCULATING INFORMATION *(CN)*	ASSOCIATOR *(AS)*	DECIDER *(DE)*	ORGANIZATION CULTURE *(CL)*
INEFFECTIVE COMMUNICATION (3)	BUDGET CONSTRAINT (1)	UNAVAILABILITY OF SENIORS IN TIME OF NEED (9)	RESPONSIBILITY AND MOTIVATION (4)
INEFFECTIVE ORDERING PROCESS (6)	STAFF SHORTAGE (2)	ROLE CONFUSION- OVERLAP OF DUTY AND RESPONSIBILITY (10)	LACK OF PARTICIPATIVE MANAGEMENT (5)
MISUNDERSTANDING COMMUNICATION (DIVERSIFIED LANGUAGE) (21)	LACK OF UNIFORM SERVICE CONDITION (8)	LACK OF DELEGATED ACCOUNTABILITY (11)	LACK OF COOPERATION (7)
	INEFFECTIVE COMMUNICATION OF PROCEDURES AND GUIDELINES (12)	INCOMPETENT PERSONNEL (20)	RESISTANCE TO CHANGE(EMPLOYEES' RESISTANCE TO CHANGES) (15)
	NO UNIFORM POLICIES (13)		NEGATIVE INFLUENCE OF UNION ACTIONS (16)
	VEHICLE SHORTAGE AND RESPONSE TIME FOR VEHICLE REPAIR (14)		LACK OF SELF-DISCIPLINED (17)
	LACK OF PERFORMANCE MANAGEMENT SYSTEM (18)		
	LACK OF RESOURCES (EQUIPMENT) (19)		
	LIMITED CAREER OPPORTUNITY (22)		

Table 9-9: The elaborated categories of top management group

DECIDER *(DE)*	ASSOCIATOR *(AS)*	CIRCULATING INFORMATION *(CN)*	TIMER *(TI)*	STORING INFORMATION *(ME)*	CONFLICT, POWER, POLITIC *(PO)*	LABOR RELATIONSHIP *(EV)*
LACK OF STRATEGY/CORPORATE DIRECTION AND FOCUS FROM CMT ON THE WAY FORWARD (2)	ABSENCE OF A PERFORMANCE MANAGEMENT SYSTEM (1)	POOR CROSS-FUNCTIONAL COORDINATION AND PROCESS MANAGEMENT (13)	POOR TIME AND ATTENDANCE MANAGEMENT (23)	LACK OF MANAGEMENT INFORMATION SYSTEM (24)	CULTURE OF NONPAYMENT (4)	ANTAGONISTIC/COMPETITIVE RELATIONSHIP WITH UNION (STRIKES & UNRESOLVED DISPUTES) (6)
LACK OF A 5 YEAR FINANCIAL PLAN OR STRATEGY – UNCLEAR BUDGETING OR FINANCIAL PERFORMANCE PARAMETERS (3)	RIGID CONDITIONS OF SERVICE (12)				LACK OF WORK ETHICS (10)	
OUTDATED JOB EVALUATION SYSTEM (5)	LACK OF UNIFORM POLICIES AND PROCEDURES (19)				UNPRODUCTIVE WORKFORCE (16)	
LACK OF A STRATEGIC CHANGE MANAGEMENT PLAN OR PROCESS (7)	TOO MANY MEETINGS / WORKSHOPS WHICH DELIVER NOTHING (20)				ATTITUDE OF SOME OF THE PERSONNEL TOWARDS THEIR WORK AND SERVICE DELIVERY (17)	
INADEQUATE FINANCIAL RESOURCES (8)					LACK OF TRUST (POLITICS – INTERNAL AND EXTERNAL) (21)	
FIRST LINE MANAGERS NOT EMPOWERED TO HANDLE THE DEMANDS OF A CHANGING ENVIRONMENT (9)						
A LACK OF STRATEGIC CAPACITY AT THE CORE OF ORGANIZATION (11)						
LACK OF EMPLOYMENT EQUITY PLAN (14)						
NOT EMPOWERING OFFICERS TO DELIVER SERVICE (LACK OF DELEGATION) (15)						
LACK OF PRIORITIZATION OF KEY ISSUES (18)						
PRESENT COMMITTEE SYSTEM: DUPLICATION AND LACK OF CO-ORDINATION, LONG DECISION MAKING PROCESS (22)						

problems that are aggravated by the stated problem. Once these scores are counted, they can be given over to the problem categories by assigning to each category the antecedent and succedent scores of those falling in the category. The activity score is the sum of the antecedent score and the succedent score of a given category. The net score for a problem or problem category is calculated by adding the position score to the net A/S score. The scoring of the elaborated category of the operational group is shown as Table 9-10. The scoring of the elaborated category of the managerial group is shown as Table 9-11. And the scoring of the elaborated category of the top management group is shown as Table 9-12.

Research Finding

(1) The problematical elements produced by the three groups verify the weaknesses of Weber's bureaucracy theory. At first, as chapter 4 reveals, the mechanistic metaphor (bureaucracy theory) that conceives human as components of machine is inadequate. People possess certain attributes that do not correspond to a machine. This inadequate metaphorical mapping can be understood in terms of two philosophical questions – *questions of principle* and *question of fact* (see Woodhouse 1994, p. 8). *Question of principle* concerns the essential difference between the subjects on our hands. For example, people have feeling, whereas a machine does not have feeling, nor its component has. The difference invites philosophical investigation whether it is appropriate to understand organization behaviour based on machine behaviour. The case study reveals that such approach is inappropriate. For instance, a machine's parts are simply goal achieving devices. They are not supposed to complain 'management style', 'individual interest' or 'unprofessionalism in dealing with employee problems'. Hence, Weber's idealistic bureaucracy, which omits vital humanistic issues, leads to fallacious conclusion that organization should be as ideal as a machine's behaviour. For example, a machine would not display a malfunction like 'fraud'. But, the operation group's model reflects that organization formed by people do display this sort of malfunction. On the other hand, *Question of fact* concerns what may come to be in the natural world. Human can reproduce human. But, will machine part reproduce machine part? People concern career opportunity, as the supervisory group's model reveals. But, will machine part concerns career opportunity? The research finding shows that human formed organization possessed

different facts to machine formed device. In other words, mechanistic conceptualisation omits certain essential facts in organization. As such, the mechanistic metaphor is incomplete and inadequate.

(2) Conjoining to the previous finding, the finding reveals that organization possesses systemic characters rather than mechanistic characters. The feedback loop of the three produced models suggest that system elements mutually influence in organic form. This finding reflects organicism metaphor is more valid mechanistic metaphor. The discovered network reflects how the system elements mutually influence. Besides, it can manifest how system pathology develops. However, organicism metaphor is not complete either. The foregoing finding shows that people are not merely a piece of 'cybernetic machine'. People have 'feeling' 'cultural thrust', 'free will' and other attributes that are not inherent in organism.

(3) The problematique produced by the three groups reveals the potential risks of merely relying on NGT to make decisions. For example, the result of NGT of the operational group reflects that 'poor two-way communication' receives the highest vote. It seems that this element should be the root problem. However, through ISM, we find that the element of 'general bad management practice' is the furthest left element of the problematique (see Figure 9-1). This suggests that the 'poor two-way communication' is aggravated by 'general bad management practice'. If we invested most of our resources to solve the problem of 'poor two-way communication', it is likely that the unsteady state would continue, owing to the solving of the wrong problem. Besides, it is very likely that the diminished problems would make a strong comeback. The reason for the outcome disparities between NGT and ISM is that we examine interrelationship among the system elements when we use ISM. Interrelationship is one of the factors that entails complexity. However, it cannot be examined by the method of voting, which, by its nature, is not systemic.

(4) The three group's results show that most of the elements that lie to the left are information- processing subsystems. The first and the second stage of the problematique of the operational group (see Figure 9-1) reveal 6 of the 8 problems to be information- processing subsystems, which can potentially aggravate all the problems lying to the right to which they connect. Consistently, the supervisory

Table 9-10: The scoring of elaborated category of operational group

CATEGORY	POSITION SCORE	ANTECEDENT SCORE	SUCCEDENT SCORE	ACTIVITY SCORE	NET A/S SCORE	NET SCORE
CIRCULATING INFORMATION ***(CN)***	19	26	63	89	37	56
ASSOCIATOR ***(AS)***	37	82	118	200	36	73
SUPPORTER ***(SU)***	9	24	26	50	2	11
DECIDER ***(DE)***	17	29	57	86	28	45
TIMER ***(TI)***	1	27	3	30	-24	-23
HUMANITY ***(HU)***	16	67	48	115	-19	-3
ORGANIZATIONAL CULTURE ***(CL)***	12	77	27	104	-50	-38
CONFLICT, POWER AND POLITICS ***(PO)***	11	55	37	92	-18	-7
ENVIRONMENTAL ***(EV)***	6	9	17	26	8	14

Table 9-11: The scoring of elaborated category of managerial group

CATEGORY	POSITION SCORE	ANTECEDENT SCORE	SUCCEDENT SCORE	ACTIVITY SCORE	NET A/S SCORE	NET SCORE
CIRCULATING INFORMATION ***(CN)***	7	25	23	48	-2	5
ASSOCIATOR ***(AS)***	31	48	77	125	29	60
DECIDER ***(DE)***	12	19	46	65	27	39
ORGANIZATION CULTURE ***(CL)***	10	80	40	120	-40	-30

Table 9-12: The scoring of elaborated category of top management group

CATEGORY	POSITION SCORE	ANTECEDENT SCORE	SUCCEDENT SCORE	ACTIVITY SCORE	NET A/S SCORE	NET SCORE
DECIDER ***(DE)***	67	68	111	179	43	110
ASSOCIATOR ***(AS)***	26	19	53	72	34	60
CIRCULATING INFORMATION ***(CN)***	6	6	11	17	5	11
TIMER ***(TI)***	5	9	7	16	-2	3
STORING INFORMATION ***(ME)***	4	12	3	15	-9	-5
*CONFLICT, POWER, POLITIC****(PO)***	17	72	11	83	-61	-44
LABOUR RELATIONSHIP ***(EV)***	4	13	3	16	-10	-6

group's problematique reveals that all the three problems to the left are information-processing subsystems (see Figure 9-2). Likewise, the top-management group's problematique reveals that the 3 problems furthest to the left are all information-processing subsystems (see Figure 9-3).

Although most of the problems produced by the three groups and lying to the left are information-processing subsystems, two of the left-hand problems produced by the operational group are relevant to people issue. They are 'unprofessionalism in dealing with employees' problems' and 'inter-worker relationship'. The problems reflect that the shop-floor level staff-members deem that the 'attitude' of the superiors' entail unsatisfactory performance. They attribute their dissatisfaction to the fact that their perceptions and feelings are not well understood and well handled by the managers. This point shows that organization behaviour cannot be understood in terms of function only. Organization behaviour covers a number of intangible factors. If we apply only LST or VSM to seek organization problems, the invisible factors could be missed.

The stages furthest to the right of the three group's problematique comprises the 'sink' or result of the problems. The result reflects that the majority of the problems of the sink (right stage) are relevant to people issue. The operational group's 'sink' shows that 3 of the 5 problems of the two stages furthest to the right are relevant to people issue. They are 'conflicting organizational and individual interest', 'ignorance of subordinates' views' and 'fraud and corruption'. The supervisory group's 'sink' shows that 3 of the 5 problems of the stage furthest to the right are relevant to people issue. The 3 problems are 'employees' resistance to change', 'negative influence of union action' and 'lack of self-discipline'. The top-management's problems in the two furthest right stages are all people problems. They are 'lack of trust (politics/ internal and external)' and 'attitude of some of the personnel toward their work and service of delivery'.

As the foregoing paragraph illustrates, the primary sources (or root) of the problems of the three groups are information-processing subsystems. It is also revealed that

the intangible people problems are mainly caused by tangible external factors. In other words, it is revealed that improvement of information-processing subsystems would help to solve the people problems, such as 'fraud', 'work ethic', 'resistance to change', 'mutual trust' and so forth.

In addition to using problematique to interpret the result, we can use both category and problematique to understand the pathology of the City of Tygerberg. The scoring of the category of the operational group shows that *associator* has the highest net score. The result implies that the largest number of problems are aggravated by *associator*. Besides, it has the highest activity score, which means that it is very active in receiving and dispensing aggravation. Although the *associator* has the second highest net A/S score, it is only 1 unit lower than the highest score category - *circulating information*. Thus, we can conclude that *associator*, according to the operational group's perception, is the most significant category of the entire problems category in terms of causing organization pathology. Furthermore, the subsystem of *circulating information* has the second highest net A/S score and net score. And it has the fifth highest activity score. The scoring shows that this subsystem is the second most significant subsystem that aggravates the other problems. However, it is not very active in receiving and dispensing aggravation.

The scoring of the category of the supervisory group shows that *associator* has the highest activity score, net A/S score and net score. Thus, we can conclude that *associator*, according to the supervisory group's perception, is the most significant category of the entire problem's category in terms of causing organization pathology. We also see that the subsystems of *decider* have the second highest net A/S score and net score and the third highest activity score. We can conclude that the *decider*, according to the supervisory group's view, is the second most significant category of the entire problem category in terms of causing organization pathology.

The scoring of the category of top management shows that *decider* has the highest activity score, net A/S score and net score. Thus, we can conclude that *decider*, according to the top management's perception, is the most significant category of

the entire problem's category in terms of causing organization pathology. On the other hand, we see that *associator* has the second highest net A/S score, net score and the third highest activity score. We can conclude that the *associator*, according to the top managerment's view, is the second most significant category of the entire problem category in terms of causing organization pathology.

Cumulatively, the findings of the category scoring reveal that the most significant category that causes the City of Tygerberg's problem is *associator*. The second and the third significant categories are *decider* and *channel and net* respectively. The result reveals that the causes of the problems impeding the performance of the City of Tygerberg lie in the information-processing subsystems. Although the *supporter*, which is a matter-energy processing subsystem, is a problematical category produced by the operational group, its scoring is not as significant as the information-processing subsystems' scoring. Besides, we should notice the categories of culture, politics and humanity, shown as Table 9-10, 9-11 and 9-12, which are relevant to people's psychology. These categories tell us that 'people perspective' play a crucial role in organization behaviour, aside from the concrete functional subsystems. But, the tables show that most of these categories have negative net A/S scores and net scores. This means that people's mental activities, although they may affect organization pathology, in the case of the City of Tygerberg are perceived as aggravated by the external concrete factors, such as the previously-mentioned information-processing subsystems, which aggravate the problems category. In a sense, the stakeholders of the City of Tygerberg tend to believe that the people problems can be eliminated through the remedy actions of repairing certain organization functions. For example, the operational group's problematique shows that 'fraud and corruption' can be eliminated through 'setting coherent policy', 'improving communication', 'sharing of information' and so forth. The supervisory group's problematique shows that 'lack of self-discipline' can be eliminated through 'improving budget and resource allocation'. The top managers' problematique shows that 'lack of trust' and 'poor work attitude' can be eliminated through improving 'strategic direction', 'performance management system' and so forth. The solutions are associated with information-processing subsystems. The

most significant information-processing subsystems in this case are *associator* and *decider*.

(5) The research result reveals while the South Africa government's policy is to amalgamate local governments to form a larger entity, government should consider whether information system are improved parallel. According to Downs (1966, p. 262) statement of 'Law of Decreasing Coordination' that the larger any organization becomes, the poor is the coordination among its actions. The research finding corresponds to this law. As we can see, the primary causes of pathology in the expanded local government – the City of Tygerberg – falls under information processing subsystems. Though the policy of merging is for fair distribution of resources, it brings into new problems that local government has to invest more resources to remedy information systems. Otherwise the new entity is difficult to achieve its desired goal. The finding suggests that hasty problem solving is harmful to the system. Clarification of problematical situation should be prior to strategic formulation. This sequence of procedure can reduce solving a wrong problem.

The research findings have served as guidelines for the CMT of the City of Tygerberg to set up priorities to eliminate the most influential problems, in order to improve organization efficiency and performance. The findings could help the local government to structure and manage its administration and to budget and plan, as outlined in the constitution of the development duties of local government. It also could help a South African bureaucracy to implement the objective of 'encouraging the involvement of community in the matter of local government'. The research process and its findings are expected to contribute to the successful transition of South African local government.

9.4 Conclusion

The application of the framework for diagnosing organization pathology in the City of Tygerberg provides meaningful data about the unsteady state of bureaucratic organization. The research findings show that:

(1) It is plausible to claim that the unsteady state of bureaucratic organization can mainly be ascribed to the problems of information-processing subsystems.
(2) In the case of the City of Tygerberg, the information-processing subsystem of *associator* is the most significant subsystem that entails pathology. This means that the deficiencies in the capacities for learning, planning and making proposals are the weaknesses of the studied organization.
(3) Two subsystems also cause significant problems. They are *decider* and *channel and net* respectively. This shows that the City of Tygerberg's decision-making has to be improved, along with an improvement of the communication channel.
(4) People issue activity plays a significant role in the organization behaviour. However, in the case of the City of Tygerberg, the result reveals that these problems are caused by the external situation. In this study, they are primarily caused by the dysfunction of information-processing subsystems.

The foregoing conclusions complement Ruscoe's (1982, 1985) research into applying LST to probe the relationship between organization efficiency and the 19 critical subsystems. Ruscoe tentatively concludes that a more efficient battalion tends to be more efficient in information processing. In contrast, this research tentatively concludes that the unsteady state of a bureaucratic organization can primarily be ascribed to information-processing subsystems. In the case of the City of Tygerberg, the *associator* is the most significant subsystem that entails pathology. Along with the exploration of functional aspects, this research attempts to seek how human psychology influences organization behaviour. The result reveals that 'people perspective' have a certain level of influence on organization behaviour. However, in this case study the research result shows that the problems relevant to people's feelings are apt to be located to the right of the problematique. This finding hints that the local government will eliminate the mind problems by solving the problems in the functional subsystem.

The application of the framework and research findings have been helpful to the corporate management team of the City of Tygerberg in pinpointing its current organization problems, with a view to prioritizing resources in order to improve organization efficiency and performance. It will also be helpful to South African local government as a whole in achieving successful transition within a complex situation.

Chapter 10 Conclusion

This chapter is about retrospect and prospect. In retrospect, we compare our research findings with the surveyed literatures to show the contributions of this study. Besides, the limitations of this research are discussed. First, grounded in Peircian phenomenology, semiotics and metaphor theory, we put forward a new concept, which takes both organization structure, process and people perspective into account, and integrate the three components to display a more complete picture for organization. The integrated notion offers a more complete approach to diagnosing organization pathology. Second, the research methodology practically surfaces how people problem and organization function mutually influence each other. In addition, some experiences of employing IM will be discussed, which might be helpful to the practitioners. Third, the research findings reveal that the primary origin of pathology in a bureaucratic organization lies in the information-processing subsystems. However, mental pathology plays a significant role in the pathological pattern. The findings hint that, in terms of organization function, the information age is very much here. It is a vital issue that managers have to confront. But human dimension problems cannot be ignored. They usually exist in pathology, as this study result shows. Organizational situations differ from one organization to another and in some circumstances, mental pathology might dominate the evolution of disease. Fourth, the limitation of this research is discussed. The limitations include: (1) the limited extent of sampling during induction phase (2) the derived pathological pattern of bureaucracy needs to be further verified (3) in some cases, multiple views could not be distinguished by straight-cut. Finally, regarding prospect, the knowledge produced in this study is like the brick. It can be progressively refined. We hope that throwing a brick can bring a piece of jade in return. Thus, we suggest some potential areas of research for probing organization behaviour. We hope that these will inspire other researchers to produce jade.

10.1 Conclusions about Research Questions and Relationships to Surveyed Literatures

In Chapter 4 we surveyed a number of literatures. The surveyed literatures show that many contemporary works focus primarily on either organization function or human issue. The functionalism mainly contains two streams: the mechanism stream and the organism stream. The mechanism stream sees organization as a machine. The organism stream sees organization as an animal, without mind. In contrast, the social system metaphor focuses on human mental activities. The different perspectives lead to different approach to tackle organization problem. They are all fundamental and providing unique contribution to organization study. But, each is applicable to certain situation, rather than all circumstances.

As such, chapter 4 outlines that the narrower scope of metaphor may run into the danger of capturing only a portion of a problematical situation. The mechanism metaphor captures the characters of 'statistic elements' and 'changing'. The ontological reductionism's contribution is to discover the invariant elements of a system and the fundamental rules of changing. The organism's contribution is to bring the interrelation of system components to light. The interrelation is the key factor of self-regulating. The social system metaphor is concerned with human mind and *will*. Each underpinned philosophy captures part of the features of organization. This part reveals that a more comprehensive view and intervention approach are required to understand organization phenomena in order to deal with its problems.

Consequently, Chapter 5 attempts to bridge the diversified conceptualizations to provide a more comprehensive notion of organization. On the one hand, we draw on Confucian thought, stressing the significance of people issue, as reflected in the Chinese characters of *Li*, *Zhong*, and *Shu*. People perspective is inseparable from organization phenomena and it serves as a foundation of an organization's viability. On the other hand, chapter 5 appreciates the contemporary functionalistic system thinkers' views of organization. The functionalism and humanism's contribution to explaining organization phenomena

suggest that an integrative concept is required. As such, chapter 5 put forwards multiple perspectives for capturing more extensive picture of organization behaviour. This concept encompasses the characteristics of cybernetic function and purposeful behaviour of an organization. These characteristics are interwoven and display the complex behaviour of organization.

Inasmuch as organization possesses multiple attributes, in Chapter 6 we deduce that organization pathology can originate in either functional components (including structure and process) or mental pathology, or in both. They mutually aggravate and present a systemic pattern. As far as organization function is concerned, we contend that the information processing subsystems are the primary sources of pathology in a bureaucratic organization. The hypothesis is produced through some empirical evidences about the incompetence of bureaucratic structure. But, while mental pathology is involved, mental elements and functional elements mutually influence and present a complex pattern, which can be seen as the more holistic picture of organization pathology. Probing of the 'pathological pattern' is one of the central purposes of this research. We intended to unveil how mental pathology and functional pathology mutually influence each other.

Instead of employing well-designed experimental conditions, we argue, grounded in the illustration of Chapter 7, that problems and complexity are cognitive phenomena; each person has his own mental model to understand the world. In order to capture a holistic picture of organization problems, inter-disciplined collaboration and interaction are essential for unveiling the invisible nature of complex problems. These are synergistic ideas , which could facilitate model interchanging among people.

In Chapter 8, we proposed a framework that is based on Interactive Management and the Living System Theory to deal with complex organization problems. The framework enables both decision-makers and affected people to express their opinions in order to surface functional pathology, mental pathology and the relations between them. Moreover, the knowledge produced by the proposed intervention framework is primarily refined through 'multiplicative corroboration'. The refined knowledge provides us with guidance for taking action to remedy the unsteady situation of a bureaucratic organization.

This is a novel way of applying IM to induction phases of finding pathological pattern in South Africa bureaucratic context. This attempt produces significant findings that can assist South Africa to smoothly pass transition period.

The framework is demonstrated in diagnosing one of the biggest local governments in South Africa – the City of Tygerberg. In the case study, we find that:

(1) information processing subsystems are the most significant subsystems that cause the unsteady state of a bureaucratic organization;
(2) in the case of the City of Tygerberg, the subsystem *associator* and the information-processing subsystems are the most significant subsystems that impact on pathology. This means that the deficiencies in learning capacity, in planning and in making proposals are the primary weaknesses of the studied organization;
(3) two information- processing subsystems are also significant. They are *decider* and *channel and net, decider* being the more problematic. This shows that decision-making processes, such as setting policies and strategies, do not always follow the right path. Besides, the transmission of information within the organization is not delivered on time. This is likely to be caused by the deep hierarchical structure of the organization and the broad scope of the city.
(4) mental pathology plays a considerable part in organization problem. It interact with functional components and present systemic relationships. The relationships show that organization behaviour should be understood from multiple angles.
(5) in the case of the City of Tygerberg, the result reveals that most of the people problems locate at the right-hand stage. This means that they are caused by other external factors. In this case study they are primarily caused by the dysfunction of information-processing subsystems. The finding implies that the mental health of the City of Tygerberg's is not intensely undermined. The people problems can be cured by remedying the information-processing subsystem.

The research findings tentatively substantiate our speculations about bureaucratic organization problems, which are illustrated in Chapter 6. We can claim that the foregoing 5 items are plausible. The result implies the coming of information age. Each

information subsystem is closely linked to the others. The malfunction of one information subsystem may lead to the dysfunction of an organization. The findings suggest courses of action that managers might take to ensure successful intervention, rather than wasting resources on solving the wrong problems.

Compared with the methodologies of surveyed literatures, our research framework considers both organization's mental pathology and functional problems. The diagnosis is conducted through brainstorming by the relevant stakeholders' and collaboration, rather than through the imposition of an experiment designer's preference. We do not leap headlong into transforming the organizational paradigm, or into reengineering an organization, or dealing with psychological issues or decentralizing the power. Rather, we first attempt to seek the pathological pattern, which is formed by miscellaneous factors. The disclosing of the pathological pattern helps us to identify the origin of the disease, which in turn prevents us from solving the wrong problems. As a result, we will not waste resources by tackling insignificant issues. Instead, our resources will be correctly prioritized to solve right problems and to improve an organization's performance.

Overall, the contribution to knowledge of this study include:

- Reflect the evolution of organization theory, and conclude that organizational concepts can be understood in terms of metaphor theory.
- Reflect conventional bureaucracy theory, and pinpoint that it deserves attentions in contemporary era owing to its inadequate mechanistic approach that leads to unable to deal with human dimension problems.
- Synthesize diversified concepts about understanding organization behavior, and propose multiple perspectives, which has wider spectrum of horizon.
- Subsequent to the forgoing arguments, this research attempts to explore pathological pattern in bureaucratic organization. The probation points out that its pathology, considering organization structure and process, is primarily caused by information processing subsystem. However, if mental pathology is involved, the pathological pattern could present a more complex form.
- Grounded in the developed theory, this research proposes an intervention framework

based on Interactive Management, employed as induction to verify the hypotheses.

- The demonstrations reveal that the research finding dovetails with the theory about the weakness and pathological pattern of bureaucratic organization, and multiple perspectives of understanding organization behavior.

10.2 Implications for Theory

This research suggests a new concept for understanding organization phenomena – multiple views. Underpinned by this notion, we deduce that organization problems to contain three parts – structure, process and people issue. We argue that the problems of the functional components should be primarily ascribed to information-processing subsystems, rather than matter-energy processing subsystems. However, the abnormal state of an organization in some circumstances cannot be understood merely in terms of organization function. Rather, it is provoked by mental pathology. In a more complex pattern, the mental pathology and functional components with each other and present nonlinear interrelationships.

In the three demonstrations that constitute the case study of this research, both managerial and shop-floor level staff pose problems that are relevant to human issue and organization function. The problematical elements display nonlinear relations. However, the research results show that the shop floor staff-members tend to seek equal treatment, while the higher level managers tend to seek governable subordinates. The result seems to correspond with Max's conflict theory; i.e., the opposition between the superiors and subordinates. It is the process of dominating others to avoid being dominated oneself.

However, if we look at this issue from a Confucian perspective, the problems can be traced to an absence of *Li, Zhong* and *Shu*, which are foundations of an organization's viability/stability. The lack of these qualities is reflected in the furthest right stages of the three groups' problematique. The furthest right stage of the problematique can be seen as the 'result' of the problems. The problematique implies that the solving of root problems may eliminate the 'results' of the problems. Obviously, the City of Tygerberg also strives to achieve a humanistic management, which comprises *Li*, *Zhong* and *Shu*. Yet, the

problematique shows that the City of Tygerberg deems that this problem is caused primarily by dysfunctional information-processing subsystems. Hence, the administration will tend to take remedy action in the information-processing subsystems. However, no matter what means are employed to achieve the ends, the pursuit of *Li*, *Zhong* and *Shu* is a common goal both in the East and in the West.

In the three case studies for the City of Tygerberg, the surfaced problematique consistently shows that the information subsystems are the most significant subsystems that provoke the unsteady state of the organization. The unearthed problematical information-processing subsystems include *associator*, *decider* and *channel and net*. These functions are primarily performed by systems 5 and 4 in terms of VSM. This implies that, as far as organization function is concerned, the performance of a system very much hinges on the higher-level subsystems. *Brain*, *intelligence* and *learning* play vital roles within an organization. Their influence on organization performance is more significant than the influence of other subsystems.

The research result intimates that there is no universal treatment for healing an organization. The treatment differs from situation to situation. Some people have heartburn because they eat too much. In contrast, some people have heartburn because they are suffering from starvation. It is inappropriate to give the same prescription for the same symptom. Rather, we should probe the interrelationships of the various factors and the origin of the disease that provokes the unhealthy condition. In the case study for the City of Tygerberg, the most significant root problem was *associator*. However, for other bureaucratic organizations, the most significant root problems might be *decoder*, *channel and net*, *memory*, or other information-processing subsystems. On the other hand, they might be related to mental pathology.

10.3 Implications for Practice

The study provides the managers of the City of Tygerberg with a more holistic picture, which captures the interrelationships between mental and functional pathology. The process manifests that interaction and collaboration are essential. They are the innate powers for self-regulation. Often, an organization ignores its own competence in

diagnosing its own problems. Indeed, organization itself is like human, who is the most proficient at detecting his health situation. Unlike a human organ, which could not say a word about the abnormal state, the components of organization – humans - can express their feelings about a situation. The 'human sensors' of an organization are dispersed at each level of the hierarchy, not merely in the higher stratifications. Thus, for the higher-level managers, a reliable way to discover the causes of a problematical situation is through collaborative diagnosis.

The research findings establish new belief for the CMT of the City of Tygerberg. The settled opinions can direct the management team to take further action to remedy the problematical situation. As was discussed in chapter 10.1 about the root problems, the further actions should focus on solving the formulated root problems. Through the practice of solving the root problems, we expect that the mental pathology will be eliminated progressively also.

Additionally, during the collaborative diagnosis through IM workshops, several problems have been uncovered. First, in the NGT process, we find that people have different interpretations of the relationship between number and rank. Some people think that '1' represents the most important element, whereas other people think that '5' represents the most important issue. Although the facilitator explained how to rank the elements before NGT was initiated, the results show that the scale of ranking used by the participants was still different. Thus, in addition to demonstrating the ranking, we suggest the addition of some simple examples on the ranking sheet, so that the participants can follow the examples and rank the elements in a consistent way. In this way, we can save significant time by not having to track down results that are ranked according to a converse scale.

Second, we found that, during the clarification of NGT, it was helpful to project the element edit screen live before the group. We found that this activity attracted the participants' attention to the clarification of the meaning of each element. One of the reasons was that the groups could observe the screen and rephrase the elements together. Besides, this activity could enhance interaction.

Third, during the structuring of the problematical elements, we found that in some circumstances it was not appropriate to display the elements being structured. For example, if the group were to find that the element of 'inappropriate leadership style' was being structured on the cause side, it might entail a psychological effect and lead the group to become cautious and thus to convert the result through the subsequent questions. This could lead to an unnatural process. However, first time participants might feel unsure of the final objective and question the tardiness of the process. Therefore, we found it helpful occasionally to project elements on to the wall, without detailed description, so that the group felt that they were making progress.

10.4 Limitations of This Research

As the outset of this study illustrate, pragmatism's knowledge is obtained through iterative refinements and corrections. Knowledge itself is unavoidable to contain fallacies. However, it is also the impulse to advance knowledge. This study contains some limitations, which should be indicated for further corrections and refinements. The limitations are as follows:

(1) Multiple views, in some cases, could not be distinguished explicitly - Let's use equation 4.1 as an example to illustrate this limitation. Equation 4.1 is about the rationalistic analysis of optimal structure of a bureaucratic organization. Though this equation is associated with certain variables to predict the best level of hierarchy, the variables could embody subjective judgement. For instance, the span of control is not an objective factor. The observer(s) might assign different values to this factor, dependent on the observer's experience or the community's agreement. In contrast, people perspective, in some cases, does not completely exclude functionalistic notion or technical view. In our daily dialogue, it is not rare to find the discussion, for example, such as 'the communication network of police force is not designed appropriately', 'this society still lacks a good mechanism to protect human right'. These dialogues contain functional terms or technical terms. We are imbued with such concepts, and they might be manifested at different circumstance.

(2) The extent of sampling during induction phase is limited – As chapter 2.4 shows, if we can prolong sampling, the conclusion will be further refined and verified. In this

study, owning to limited time for conducting IM sessions, the people who have significant knowledge about the operation of the City of Tygerberg are priority to participate in the workshop. The civilians of the City of Tygerberg are not invited to attend the workshops. It will be valuable if some workshops could be conducted for the civilians. The obtained problematique can be used to make a comparative study to the result obtained through the three workshops. As a consequence, the sampling procedure is prolonged; the claim could be more confidential.

(3) The derived pathological pattern of bureaucracy could vary from case to case – As the discussion in chapter reveals, the pathological pattern of bureaucratic organization is not conclusive. In some cases, people issues could be the sources of problems. In some cases, people issues might not be a concern to the studied organization. The problem set might contain very little people problem. In contrast, in some cases, people problems might take the highest percentage of the problem set. The result might be dependent on the context and supra-system of the studied organization. However, heretofore, the theoretical arguments and empirical evidences reveal the common problems of bureaucratic organization lie at information processing subsystems. But, we could not definitely point out which information subsystems is the most influential problematical element. It requires further empirical study to support a confidential claim.

10.5 Potential Researches

Solutions to the problems

We find that the most significant problems of the bureaucratic organization – the City of Tygerberg – are *associator*, *decider*, and *channel and net*. The next step is to determine the prescriptions for healing the disease. Through slight modifications of the trigger question of the ISM software, we can produce prescriptions through group collaboration. For example, the trigger question can be modified to: 'How do we improve the City of Tygerberg's planning and management activities?' We can get a list of options, one list for each problem category. Then, we can select the options seen as best from each category.

The procedure of our framework, which is proposed in Figure 8-3, is applicable after a

slight modification. The participants can be asked to generate a set of action options that can contribute to the improvement of planning and management activities. Then, we can change the generic question to: 'Does solution A helps to achieve solution B?' Through the iterative questions posed by the computer, we are able to obtain an Intent Structure that looks like problematique. The findings will be helpful to us in deciding the most meaningful rectification actions. On the other hand, accompanying the establishment of a DELTA Chart we can see how the various options will be implemented through time.

Group's Cognition

Simon (1974) conducts a research about human's short-term memory. The research findings reveal that human memory can cope with about 7 items. It could be three elements and their four relationships. Or, it could be seven digits or words. The magic number reflects an individual's capacity to cope with complexity.

In contrast to Simon's research, our case study can be seen as probing the group's learning process. Interestingly, the three case studies show that there are approximately 7 to 8 levels of hierarchy in the produced models. (A similar figure is also found in one of our workshops for South Africa's news medium company, NASPER. There are 8 levels in the produced hierarchical structure.) Consistently, this figure is reflected in Warfield's (1994a) workshop of 'analytical powertrain'. What is noteworthy is that hierarchy is an indicator of a system's complexity. The more levels the hierarchy has, the more complex the system is. Thus, the number of levels of a hierarchy structured by a group during an IM workshop implies the group's short-term capacity for unraveling the complexity of a system. In other words, it reflects the group's capacity to identify the interrelationship of elements and its capacity to cope with complexity. The empirical data of our research and the other empirical data seem all implicitly to hint that the group's cognition capacity to unravel the hierarchy of a system is to within 7~8 levels. This interesting figure is worthy of further exploration. However, more workshops are needed to substantiate this hypothesis.

Elaboration of produced problematique for SDM

In Chapter 3 we discussed that the causal diagram of SDM can itself stand as an

independent field for study. The reason is that people have different perceptions of causal relations. Some people might think that the causal relationship between two elements is not significant, whereas others might think that it is significant. For example, whether economic growth will influence the crime rate is a view that differs from person to person. Some people might think that the stronger the economy of a society; the more people indulge in sensual pleasure. The more people indulge in sensual pleasure, the more they acquire what they want by unlawful means. Consequently, economic strength can lead to an increase in crime. But, some people might think that a good economy would result in better resources and working conditions for the police, which would raise the quality of policing, which in turn would help to curb the increasing crime rate. Therefore, the other opinion might be that economic growth would decrease the crime rate.

Similar issues occur frequently in management practice. When the number of elements increases, the opinions as to whether a relationship exists between two elements also increases. Hannon and Ruth (1994) suggest keeping the designation of state and control variables as simple as possible at the beginning. However, the proposed IM process in this research can enhance the group's capacity to deal with large numbers of elements and their interrelationships from the beginning. The produced digraph can serve as the beginning point towards a more refined and elaborated influence diagram. If we prepare to add more elements to the digraph, the computer software has the function of adding the new elements to the problem set and to pose a series of questions to identify whether the relationships exist between the new elements and the existing elements.

We hope that the foregoing suggested potential researches will inspire other researchers to produce more fruitful results. We hope that the thrown brick could bring a piece of jade in return. Jade has the vitality to encourage people to establish organizations with 'healthy function' and 'healthy mental'. In such organizations, humanity is steadfastly imprinted. Self-organizing elevates organization effectiveness. Collaboration displaces oligarchy. Problems and conflicts gradually vanish through human interaction and cooperation.

Appendix A

The underpinned algorithm of ISM is for producing archival relationships between various elements through the manipulation of binary matrices. The stakeholders normally start with a messy situation, which needs to be structured. Structuring a problematical situation implies to identify the elements that relate to the situation or cause the situation and to develop a pattern of the relationship or a contextual relationship of the elements and to present this pattern in form of a directed graph. The mechanics of structuring problems in ISM is based on the theory of directed graphs (see Harary *et al*, 1965). The contextual relationships of the generated elements are required to be transitive in nature. For example, if element A is heavier than element B and element B is heavier than element C, then, it can be inferred that A is heavier than C. The contextual relationship in this example is the term 'is heavier than'. Feedback among the elements is possible in some contextual relationships. For example, a contextual relationship such as 'help to achieve' might generate a directed graph, which include feedback or cycle(s). Once the problem is posed, the process of structuring starts with a team replying to a series of questions aimed at establishing the contextual relation between two elements at a time. If the answer is a 'Yes', then, a '1' is entered into the cell of the reachibility matrix of the elements. Otherwise, a '0' is entered signifying that the contextual relation between the two named elements does not exist. A simple reachibility matrix that represents the contextual relationship 'Is heavier than' of four elements is shown as follows:

	e_1	e_2	e_3	e_4
e_1	1	1	0	0
e_2	0	1	0	0
e_3	1	1	1	1
e_4	1	1	0	1

e_1 : Pencil e_3 : Car
e_2 : Feather e_4 : Desk
Contextual Relationship: 'is heavier than'

The manipulation of the reachibility matrix to obtain a directed graph is undertaken by a computer. The underlying algorithms are discussed in Warfield (1974). Figure A-1 shows a generated directed graph from the above reachibility matrix of weight comparison. It is

a simple model, which illustrates the transitive inference of elements, and the result is a linear relationship.

Nevertheless, the relationships of the elements in societal system are normally nonlinear. The following reachibility matrix exemplifies a simple nonlinear contextual relationship of 'help to achieve' of four elements. (The entries are assumed by the author; however, they could be changed based on the broad consensus of relevant stakeholder.)

	e_1	e_2	e_3	e_4
e_1	1	1	1	1
e_2	0	1	1	1
e_3	0	1	1	1
e_4	0	1	1	1

e_1 : Innovative Ideas e_3 : Create New Products
e_2 : Research and Development e_4 : Profit
Contextual Relationship: 'help to achieve'

Figure A-2 shows the extracted digraph of the above reachibility matrix. Figure A-2 is called a non-linear hierarchy (see Satty, 1980). Moreover, the relationship among elements is called nonlinear (see Forrester, 1961). The structured model is systemic in nature and the process of constructing the model is in a cooperate environment.

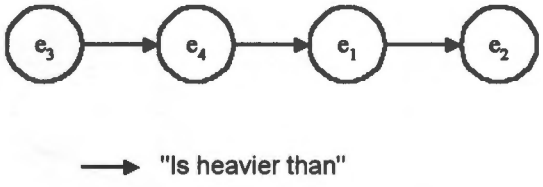


Figure A-1: Directed Graph of Weight Comparison

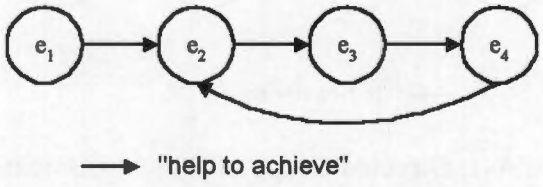


Figure A-2: Digraph of 'help to achieve' Relationship

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